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Table VI summarizes the results in terms of main categories only.[9] Column A shows the number of "instructional" activities; Column B, the total number of reported activities per category. In the last column, the per cent of "instructional" activities per category is given. This is obtained by dividing the number in Column A by the corresponding number in Column B.

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p. 336, 1st column, line 16: "lend assistance" (the "s" after the "l" was omitted).

p. 344, 2nd column, last paragraph, line 2: "as someone who" (the "w" in someone should be deleted).

p. 351, footnote 16, line 6, "Dennis (10) in his study . ." (the letter "s" should be added to "study").

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p. 359, references 17, 20, 25, 30, 44 and 56: Year of publication is hyphenated and printed on two lines: thus, "19–09" is to be read "1909" and "19–39" is to be read "1939", etc.

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RELATIONSHIPS BETWEEN CERTAIN ATTITUDES TOWARDS TEACHING AND TEACHING SUCCESS

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SECTION I

INTRODUCTION

A. Statement of the Problem

THE STUDY to be presented herein was undertaken with three purposes in mind: (1) to discover, if possible, any common factors that may underly the reasons given by undergraduates for the choice of teaching as a profession, (2) to determine whether the answers given to essentially the same questions in two different types of testing devices reveal comparable data, and (3) to investigate the relationship between the reasons given for choice of profession and subsequent teaching success as measured by criteria of efficiency and acceptability.

B. The Importance of the Problem

This study is of a descriptive and exploratory nature. That it is important to know what characteristics of prospective teachers are related to success is attested by the volume of studies in this area. These studies have met with varying degrees of success in terms of prediction, and conflicting results have often appeared. It is the belief of the writer that one of the reasons for this lack of uniformity in results is in the complexity of the profession of teaching. Anderson[1] states that over one million people in the United States call themselves "teachers." Since this is the case, hundreds of activities are involved, and "success in teaching" must be defined in numerous ways. It is postulated, however, that in spite of the varying teaching situations existing, the varying abilities of the persons engaged in teaching, and the various activities in which these persons engage, that there may be something in common to all teachers which causes them to be described as "successful" or "unsuccessful." This may be the motivational pattern or reasons for choice of teaching as a career.

Should it be found that persons intending to make teaching a career have a relatively few reasons for choice of teaching, and should a relationship be found between certain of these reasons and teaching success, the processes of teacher recruitment, selection, placement, training, and induction might be improved. It is hoped that this study may provide an indication of the reasons for choice of teaching felt by prospective teachers, some definition of any common factors involved in these reasons, some notion of how well these reasons may be revealed by different testing de-

* The writer wishes to acknowledge and extend thanks for the help of A. S. Barr for making subjects available and for guidance in the execution of this study; to C. W. Harris for guidance in the areas of factor analysis; to Glenn Eye for cooperation in making possible the visiting of beginning teachers; and to C. E. Ragsdale for his assistance in examining the psychological aspects of this study. The writer further wishes to acknowledge the help of Miss Dorothy Knoell in applying the techniques of of factor analysis employed herein. The assistance of members of the visiting group, of the superintendents of schools, and of the beginning teachers to whom is due whatever of value may appear in the results of this study is gratefully acknowledged.

1. G. L. Anderson, "Popular and Professional Misconceptions Regarding the Teaching Profession," Educational Forum, XIII (November 1948), pp. 51-62.

vices, and an idea of the relationship of various reasons to teaching success.

SECTION II

PLAN OF THE INVESTIGATION

1. The Subjects

TWO GROUPS of subjects were used in this study. One group consisted of sixty-three men and the other of thirty-seven women, taken from students enrolled in the University of Wisconsin School of Education undergraduate course in "The Nature and Direction of Learning." Test data were collected while the subjects were first semester seniors, in the fall of 1949. In the late fall and early winter months of the school year 1950-51, data relative to the subjects' success as beginning teachers were collected for two subgroups of sixteen men and eighteen women.

The American Council on Education Psychological Examination percentile scores were available for most of the subjects. Distributions of the scores of the groups and subgroups are shown in Table I. Lins'[2] study also provided distributions of scores for this examination in regard to students admitted to the School of Education in 1946 whose first choice of career was teaching. These data are presented, for purposes of comparison, in the same table.

While selection of these subjects was made purely on a basis of their availability for study, they are thought to be representative of Wisconsin graduates granted the University Teachers Certificate.

Grade point averages, calculated for a period of four years of college attendance were available for each group. Data, gathered in 1949, for all School of Education graduating students are shown in Table II, together with data for the subjects. The groups do not appear markedly different from the 1949 population in terms of means and standard distributions. It cannot be determined whether this comparison would hold over a period of years, since figures are not available.

Since the subgroups ultimately studied consisted of sixteen men and eighteen women who were beginning teachers in the school year 1950-51, it is seen that only 25.4% of the men and 48.6% of the women in the original groups entered the teaching profession immediately. If this situation is consistent throughout the School of Education, nearly 75% of the men and over 50% of the women being prepared to teach do not make immediate use of their professional education.

2. Instruments Used in the Collection of Data

2.1 The Paired-Comparison Test

Examination of the studies reporting reasons for the choice of teaching as a career by various groups of subjects led to forty often given answers. Judgments were used in grouping these forty reasons into a smaller number of reasons, which, when validated by the opinions of three University of Wisconsin professors, experts in the fields of psychology and education, emerged as thirteen reasons for the choice of teaching used in the paired-comparison test and the questionnaires. A table of random numbers was used in producing the order in which the pairs of choices were listed, and the items of choice appeared alternately in the upper and lower lines of the pairs. The test is reproduced in Appendix A. *

Reliability of the test was estimated through usage of the Kuder-Richardson formula 21.[3] The formula as applied is

$$r = \frac{n}{n-1} \cdot \frac{(\sigma^2 - n\,\overline{pq})}{2\sigma}$$

where n is the number of items, σ is the standard deviation and $\overline{pq}$ the average variance of the responses to the test items. As used in this study reliabilities were computed for each reason, treating it as an individual test, resulting in thirteen reliability estimates. A choice of an upper reason in a pair was considered as "p", and a choice of a lower reason as "q" for the formula used. It is stated by the authors[4] that this formula will always underestimate, though not seriously, the reliability, depending upon the extent that items differ in difficulty. Reliabilities are shown in Table III.

This test was administered December 15, 1949, men's and women's groups not being separated. Though no time limit was specified, stu-

2. L. J. Lins, The Prediction of Teaching Efficiency, unpublished Ph.D. Dissertation, University of Wisconsin, 1946.

* All references to Appendices may be found in original thesis on file in Library, University of Wisconsin.

3. G. F. Kudder and M. W. Richardson, "The Theory of the Estimation of Test Reliability," Psychometrika, II (1937), pp. 101-160.

4. Kudder and Richardson, Op. cit., p. 159.

TABLE I

AMERICAN COUNCIL OF EDUCATION PSYCHOLOGICAL EXAMINATION PERCENTILE SCORES OF SUBJECTS AND LINS' 1946 SUBJECTS

	Frequency					
	Groups		Sub-Groups		Lins' Groups	
Interval	Men	Women	Men	Women	Men	Women
98-100	2	2	2	1	..	1
91-97	3	3	..	2	..	5
84-90	6	4	1	3	..	13
77-83	4	4	2	2	..	3
70-76	7	1	1	1	1	9
63-69	4	2	1	1	3	7
56-62	4	4	..	1	..	1
49-55	4	1	2	1	2	5
42-48	1	2	1	1	4	4
35-41	1	..	..	..	1	6
28-34	3	2	2	2	1	2
21-27	2	2	..	..	4	1
14-20	2	..	1	..	1	1
7-13	..	1	..	..	1	1
0-6	..	..	..	..	1	..
No Data	20	9	3	3	..	..
Total	63	37	16	18	19	59

TABLE II

GRADE POINT AVERAGES OF SUBJECTS AND 1949 SCHOOL OF EDUCATION GRADUATES

	N	Mean	Standard Deviation
Group			
Men	63	1.743	.365
Women	37	1.907	.486
Sub-Group			
Men	16	1.714	.468
Women	18	1.862	.416
1949 School of Education Grads.			
Men	69	1.854	.422
Women	136	1.889	.359

TABLE III*

RELIABILITY ESTIMATES OF PAIRED-COMPARISON TEST

Reason	Men (N=63)	Women (N=37)
1	.86	.76
2	.69	.72
3	.84	.76
4	.66	.49
5	.84	.85
6	.78	.85
7	.93	.88
8	.75	.65
9	.85	.87
10	.76	.75
11	.64	.79
12	.71	.81
13	.72	.40

TABLE VI

MEN'S PAIRED-COMPARISON TEST INTERCORRELATIONS AND RESIDUALS—R

Var.	1	2	3	4	5	6	7	8	9	10	11	12	13
1		-005	048	-003	-042	-015	-062	063	047	027	-076	-035	-030
2	-382		031	-024	053	-078	000	000	065	-009	-074	010	028
3	341	-301		034	-004	051	021	-021	-080	-037	060	-036	-040
4	-251	191	-094		-047	006	-021	010	-005	051	002	011	-026
5	-019	-021	136	-063		-024	-039	045	072	024	-044	005	-003
6	298	-150	-054	-353	000		011	-033	-023	034	033	046	-015
7	-322	-005	-273	-039	-463	-097		054	041	010	-034	013	007
8	-298	137	-171	-179	-428	144	350		-012	-045	-029	011	-025
9	-106	169	253	016	192	088	-438	-021		-073	-040	002	-018
10	114	-012	-321	012	-159	-014	-101	-186	-307		061	-004	023
11	-168	-083	-354	187	-066	-150	055	-150	-285	173		-004	057
12	-113	-265	-292	028	-180	-260	431	065	-560	034	291		013
13	-256	071	-188	188	195	-147	-214	-175	111	188	046	-028	

* Tables IV and V may be found in Appendix of the original thesis on file in the Library of the University of Wisconsin

dents were urged to work as rapidly as possible, so that their immediate response to each pair of choices was recorded. It was felt that in this manner reflection over choices, with possible misleading or over-conscientious answers, would be largely eliminated. The time required for the last person finishing was five minutes and twenty seconds.

For purposes of analyzing results, scores used were merely the numbers of times each item was chosen, rather than a ranking of items. In this manner it is thought that the relative importance of each item to the subject was shown in comparison to each other item. This test does not demonstrate the degree of importance of the items in comparison with absolute standards, since all of the items could be of great importance, or on the other hand, of little or no importance at all.

Certain assumptions are made in the use of the paired-comparison type of test. Guilford[5] lists several assumptions which may be made in the usage of the paired-comparison test. In this study, the assumption will be made that discriminal dispersions are equal, or that the stimulus values for all test items are equal. It is not possible to assume that the intervals between the items in the continuum of reasons for choice of teaching are equal, but this is unnecessary for this study, rank order of choice of items serving to suffice. It must be assumed that items are of equal difficulty and familiarity to the subjects, and the meaning of each item is clear and unambiguous.

The circularity of this test is such that if a given item is consistently chosen, other items must be left unchosen. The forcing of a choice where no real choice can be made, and the inability to permit more than one item to have a maximum score (of 12) are disadvantages of this instrument. Advantages include the unlikeliness of the subjects' seeing response patterns being built up, due to the random order in which the items were paired and to the time pressure placed upon the subjects.

2.2 The Ranking Questionnaire

The Ranking Questionnaire entitled "Influences in My Choice of Teaching as a Profession" was devised in order to compare responses made to essentially the same questions in a different type of testing instrument. This questionnaire is shown in Appendix B.

The continuum, reasons for choice of teaching is the same as in the paired-comparison test. The two instruments are much alike in that both require comparison of each item with every other item. In the case of the paired-comparison test, however, the items are not all in evidence at any particular time, and time pressure is used. A factor due to residual stimuli from previous items of choice may be present in the paired-comparison test but not present in the ranking instrument. It is believed that the ranking type of questionnaire is easier for the subjects to use, being less lengthy and displaying all items at once, but Guilford[6] states that one instrument is as valid as the other.

Unlike the administration of the paired-comparison test, subjects were given all the time they wished for completing the ranking questionnaire. Ranking of reasons for choice was orally requested, in order from 1 to 13, highest to lowest.

Since opportunity to think about responses is given, careful introspection may be used. However, this instrument can be readily "cooked" and made to show whatever the subjects desire to be shown. One of the purposes of this study will be to examine the differences in responses between the instruments.

According to the law of central tendency,[7] the stimuli ("reasons for choice" statements) tend to group at or near the center of the stimulus continuum scale. A problem is presented in that stimuli have one value when alone or in one context, and another in another context. It is believed,[8] however, that when the number of stimuli is small (under 20) and when the number of judges (subjects) is also small, the mean or median rank of each stimulus gives roughly its relative scale position in the series. Since this study is not concerned with scale distances, further statistical analysis was not deemed necessary, and raw scores were considered a sufficient indication of the scale position of each item in each instrument.

Items used in the ranking questionnaire were judged adequate in terms of clearness of meaning, capability of being distinguished from each other, insight of subjects into their own motivational patterns, and pertinency to the reason for choice continuum by the three experts from the

5. J. P. Guilford, Psychometric Methods (New York: McGraw Hill Book Co., 1936), Chs. VII and VIII

6. Guilford, op. cit., p. 260.

7. Guilford, op. cit., p. 257.

8. Ibid., p. 255

School of Education, previously mentioned.

2.3 Comparison of Professions Questionnaire

The questionnaire called "Beliefs of Advantages of Various Occupations" lists fourteen professions, including that of Education, commonly listed as choices of occupation by subjects in such studies as those of Best, Fox and Richey, and others previously mentioned. Each of the thirteen reasons for choice of teaching as a profession is ranked by the subjects in regard to each profession listed. The result is a ranking of the way the various professions are regarded insofar as relative beliefs in security, financial reward, etc., are concerned. This instrument is shown in Appendix C.

The second page of the instrument is designed to study possible choices of other professions than that of teaching, and reasons for not pursuing those professions instead of that of teaching. It was believed that, since teaching may not have been the first choice of occupation of all subjects, some indication of the more powerful motives for the choice of teaching as a profession may thus be revealed.

2.4 Strong Vocational Interest Blank

According to the Mental Measurements Yearbook,[9] this test has a reliability of from .85 to .90. Validity was gained in the construction of the test, since items were used which were shown to differentiate between workers in the various fields and those not in the fields. This test was given at the same time as the others as a possible check on the subjects' interest in teaching as compared to interests in other fields.

2.5 Autobiographies

Autobiographies of forty-one of the subjects were obtained which had been written in 1948 as a requirement for the undergraduate course entitled "The Child, His Nature and His Needs." Being relatively unstructured and freely written, it was believed that some light would be shed upon the nature and length of the subjects' interests in teaching.

3. Criteria of Teacher Success

3.1 Visitation of Beginning Teachers

Of the sixty-three men and thirty-seven women used in the original testing, sixteen men and eighteen women obtained positions and were visited as beginning teachers. When the subjects had been located, letters were sent to the various superintendents of schools, asking that opportunity for observation and interviews be given to certain qualified persons from the University of Wisconsin. Two observers visited at least two classes of each beginning teacher, interviewed the teacher, and the superintendent.

3.2 Criteria of Teaching Efficiency

Teaching efficiency was measured by the overall rating of the Wisconsin Adaptation of the M-Blank. The sub-divisions were considered as guides for observation, the final rating only being used for purposes of this study. In addition to ratings of two University observers, a copy was left with the superintendent to be employed at his leisure in the near future. An average of the three ratings was used as a criteria of teaching efficiency.

3.3 Superintendent's Interview

Teacher acceptability, one of the criteria, was determined from an interview with the superintendent. This is a subjective measure of the desirability of the teacher to the community as related not only to teaching efficiency, but to personality traits of many kinds, including character, adaptability, and interest in the community. It was desired to make the interview as unstructured as possible, but the following questions, if not answered informally, were asked:

a. How do you like this teacher? (Why?)

b. Is he pretty well liked by other teachers? (Evidence?)

c. What do the parents think of him? (Evidence?)

d. Is he active in the community? (Evidence?)

e. Does he seem happy here? (Evidence?)

f. As you see him, if he continues to grow as expected, will you offer him a contract next year?

g. Would you be unhappy if he left? (Why?)

h. What are his main assets? Problems?

i. As a whole, how would you characterize this teacher in terms of being extremely acceptable, above average, average, poor, or failing?

The acceptability rating in question "i" above, made by the superintendent, was consid-

9. O. K. Burros, Mental Measurements Yearbook (New Brunswick, N. J.: Rutgers University Press, 1946).

ered sufficient. The three M-Blank ratings were averaged for use in this study, but in the case of acceptability ratings, the superintendent was considered in the best position to know and state the case for or against the teacher.

SECTION III

FACTOR ANALYSIS OF TEST DATA

A. General Nature of Factor Analysis Techniques Used in This Study

ONE OF THE problems with which this study is concerned is that of discovery of any common factors which might be found in the reasons given for choice of teaching as a profession, using various testing instruments. The problem will be studied through the use of factor analysis. A brief summary of the general nature and theory of factor analysis will first be given. This treatment will include a discussion of the centroid method of factoring and the methods of rotation used in this study.

Certain hypotheses concerning the nature of expected factors were made in regard to the paired-comparison test and the ranking questionnaire. Each hypothesis will be described, with reasons for its postulation. Presentation of data, interpretation and comparison of results will follow.

1. General Theory of Factor Analysis

In this study essentially the same questions were asked in two different instruments, concerning thirteen possible reasons for the choice of teaching as a career. Through intercorrelations of the test scores, matrices were obtained, which through factor analysis techniques, can be described in terms of factors. These factors furnish information concerning the variance of the test scores in terms of common elements underlying the responses to the questions.

Hypotheses were made concerning the nature of the test answers expected. Factor analysis, through parsimonious description of the variables (test questions), offers a way to test these hypotheses.

Factor analysis is concerned with the variance of the set of variables under consideration. Any variable (e.g., reason for the choice of teaching) may be represented in terms of underlying factors by a simple linear equation of the type

$$z_j = a_{j_1}F_1 + a_{j_2}F_2 + \dots a_{j_2}F_j + \dots a_{j_m}F_m + a_jU_j,$$

where z_j is the variable and F_1, F_2, ... F_j, ... F_m are factors with coefficients a_1, a_2, and a_j. The factors F_i are group factors, common to several but not all variables, but U_j is a factor contributing to the variance of that variable only.[10] If the variables are taken in standard form and assumed uncorrelated, the squares of the coefficients of the factors can be stated as 1 = variance = $a_{j_1}^2 + a_{j_2}^2 + \dots a_{j_i}^2 + \dots a_{j_m}^2 + a_j^2$. For any variable, the sum of the squares of the common factor coefficients is known as its communality, h^2. The square of the factor coefficient unique to that variable only (a_j^2) is known as the uniqueness and indicates the extent to which the common factors fail to account for the total variance of the variable. The uniqueness can be separated into specificity (contribution of the specific factor) and unreliability (extent to which a test fails to measure whatever it measures). Only if specificity vanishes does communality equal reliability.

The factor coefficients $a_{j_2}, \dots a_{j_i}$ may be formed into a factor matrix F. When only common gactor variance is shown (i.e., omitting a_j), the reduced factor matrix resulting is of the type used in this study.

If the intercorrelations of the variables are placed in matrix form, including the correlations of 1.00 of the variables with themselves, this complete correlation matrix will be square and symmetrical, since $r_{jk} = r_{kj}$. It can be shown that the unique factors contribute only to the diagonal cells of the correlation matrix, and since in solution only the common factor contributions are desired, the diagonal cells must be reduced from unity to the required communalities. A problem appears in finding communalities to be used in the matrix.

The fundamental factor theorem[11] states that the product of the reduced factor matrix F and its transpose F' is the reduced correlation matrix (i.e. FF' = R). It is further shown that the number of common factors represented in a reduced correlation matrix is equal to the rank of the matrix and also the rank of F.[12] The problem here is to account for as much of the relations between variables as possible, by the smallest number of

10. K. Holzinger and H. Harman, Factor Analysis (Chicago: University of Chicago Press, 1941), p. 12.

11. L. L. Thurstone, Multiple-Factor Analysis (Chicago: University of Chicago Press, 1947), p. 81.

12. Ibid., p. 82.

common factors, which in turn implies statistical limits for determining when the residuals are negligible. This will be discussed later in regard to the centroid method of factoring.

Thurstone[13] makes use of geometrical analogy to clarify the relationship between the correlation matrix R and the factor matrix F. Numerical factor loadings from the entries in the rows of F may be plotted as co-ordinates of a point. The point may be considered as the terminus of a test vector. Each of the variables in the factor matrix may be similarly plotted, and as many test vectors as variables are thus represented in the diagram. Since the factors are considered to be uncorrelated, unit length reference vectors may be placed at right angles to each other and entered in the diagram. If F contains only two columns, a two dimensional plot will suffice, but if three or more columns exist in F, representation must take place in three dimensional or higher forms. Geometrically, each factor loading a_{jj} is now represented as a projection of the test vector j on a reference axis m.

The intercorrelations of the test scores are also represented in this diagram, since it can be shown that the correlation between any two tests or variables is the scalar product of their test vectors. It should be noted that the side entries of the correlation matrix R determine the angular separation of the test vectors, since the scalar products of any pair of vectors is equal to the corresponding correlation, but the lengths of the test vectors are determined by the diagonal cell entries, since the length of a test vector in the common factor space is equal to the square root of the communality. The rank of the correlation matrix is the same as that number of dimensions needed to represent the correlations geometrically, and is the same as the number of common factors in the test battery.

An indefinite number of factor matrices F can be written which will, throught the multiplication FF', reproduce the correlation matrix R within limitations. F is therefore not a unique solution.

A further problem of rotation of the references axes must be solved. This will be described later in some detail.

2. The Centroid Method of Factoring

The term "centroid" as used in factor analysis is closely allied with its mechanical concept. In mechanics, the centroid is a point in a mass where the center of gravity is located. In factor analysis, the centroid of the end points of the test vectors might be considered the location of the center of gravity of equal weights at the points. The main centroid axis is regarded as an approximation to the major principal axis of the factor configuration. Thurstone[14] has shown that the sum of all the coefficients in a correlation matrix is equal to the sum of the squares of the column sums in any corresponding orthogonal factor matrix. Since the centroid may be considered to determine the first axis, it has zero projections on the other axes. In this manner it can be shown that the sum of the coefficients in the correlation matrix is equal to the square of the sum of the first centroid factor loadings, permitting factoring through simple summational procedures.

The configuration of vectors is likely to have extensions in many directions. It is desirable to reflect the columns of the matrix having negative sums of correlation coefficients or residuals, (in affect reflecting the vectors, and removing the centroid from the origin) thus accounting for as much of the correlation coefficients as possible and leaving minimum residuals. It is useful to begin with the column which has the largest absolute sum, under the assumption that the corresponding test vector is likely to be in, or near, the longest dimension of the test configuration.

Having located one centroid and used its axis as an approximation to a principal axis of the configuration of test vectors, it is then possible to repeat the process as desired until all factors have been determined. Each centroid axis is at right angles to each preceding axis, since centroid factoring results in an orthogonal solution.

Each extraction of a centroid factor reduces the residuals in the correlation matrix. The process is ordinarily ended when the standard error of the zero correlation is shown to be larger than the standard deviation of the residuals. Also, since only common factors are desired, only communalities are placed in the diagonals of the correlation matrix. When these communalities have been completely reduced, it is time to stop factoring. The problem of estimating communalities can be solved in various ways.[15]

3. Methods of Rotation Used in This Study

The problem of rotation has been met in this study through techniques based upon the work of Harris.[16] The postulate was made that a 6-space

13. Ibid., Ch. III.

14. Ibid., p. 150.

15. Ibid., Ch. XIII.

16. C. W. Harris, "Projections of Three Types of Factor Pattern," Journal of Experimental Education, XVII (March 1949), pp. 335-346.

hypertetrahedron satisfactorily represents the factor pattern. Through the uses of extended vector diagrams of the centroids, points were identified whose relative positions are consistent from diagram to diagram. These points were considered to represent regions of complexity one in the hypertetrahedron, or the primary axes of the factor pattern. The co-ordinates of the points were taken as direction numbers and normalized to produce a transformation matrix T of direction cosines, which would transform the centroids directly to primary structure.

Relationships between primary structure and simple structure have been shown by Harris and Knoell,[17] among others, to be such that one can be found from the other. The direction cosine matrix T was pre-multiplied by its transpose T' to yield Φ, a matrix of intercorrelations of the new factors. The inverse Φ^{-1} was found, which, when pre-multiplied by T produced a matrix of direction numbers. This matrix was normalized, resulting in λ which transformed F into V, the simple structure.

In this study V contained a number of relatively large negative factor loadings. This was considered to be a function of the closed system characteristic of the paired-comparison and ranking types of instruments. That is, the sums of each subject's original scores was 78, of necessity. This resulted in making the original test scores appear much like deviation scores, with a resulting appearance of many negative intercorrelations among the variables. This was further reflected in the negative factor loadings which appeared in the structure and which were considered difficult to interpret. It was therefore proposed that the number of zero loadings in the structure be kept at a maximum, but that the negative loadings be removed if possible. Radial rotations were used to accomplish this, and a new set of factors was thereby produced. The following procedure was then used to determine a new Φ matrix of intercorrelations between the factors.

$\lambda'\lambda$ was found and the inverse $(\lambda'\lambda)^{-1}$ calculated. A matrix D, the reciprocals of the square roots of the diagonal entries in the inverse, was then used to pre- and post-multiply $(\lambda'\lambda)^{-1}$, producing the new Φ matrix of intercorrelations of factors.

B. Hypotheses Made Regarding Expected Factors

Three hypotheses were made regarding factors expected from analyzing the Paired-Comparison test and Ranking Questionnaire for Men's and Women's Groups.

1. The Paired-Comparison Test

The hypothesis was made that at least two group factors might be found:

a. A factor involving interest in people and interest in professional advancement, and

b. A factor involving opportunity to pursue a favorite (subject matter) interest, security against job loss and layoffs, and desire for professional advancement.

This hypothesis is partly predictated upon studies by Darley[18] and Ferguson, Humphreys and Strong[19] who found that interests of teachers can ordinarily be grouped into two types: those interests belonging primarily to teachers of the natural sciences, and of a character more in keeping with subject-matter than with teaching itself; and those interests belonging primarily to teachers of social sciences of a character showing interest in people. Darley has named factors demonstrating these interests "Technical" and "Welfare or Uplift, Type A" factors. Ferguson, Humphreys, and Strong,[20] found that teachers exhibited either Thurstone's "people factor" or "science factor" types of interest.

Many psychologists now believe that the various aspects of personality are distributed among members of a population in the nature of a continuum, rather than a dichotomy. Interests should be so distributed. It is to be expected that some persons will lean heavily toward interest in subject matter and the technical aspects of their field, whereas others will tend towards interest in people, and many will show some degree near the middle of each continuum. Factoring of intercorrelations of the variables should reveal factors, then, of interest in people and in subject matter.

Other findings of Darley[21] indicate that those persons most strongly interested in the "Tech-

17. C. W. Harris and Dorothy M. Knoell, "The Oblique Solution in Factor Analysis," Journal of Educational Psychology, XXXIX (November 1948), pp. 385-403.

18. J. G. Darley, "A Preliminary Study of the Relations Between Attitude, Adjustment, and Vocational Interest," Journal of Educational Psychology, XXIX (1938), pp. 467-473.

19. Ferguson, Humphreys and Strong, op.cit.

20. Ibid.

21. Darley, op. cit., p. 467.

nical" aspect of teaching (or other occupations) have poorer morale than all other groups except his "Verbal", and further tend to have feelings of inferiority and poor social adjustment. For this reason it was felt that an interest in subject matter would be accompanied by an interest in security.

Judgments made from studying the work of Yeager,[22] Tudhope,[23] Lee,[24] Gould,[25] Fox and Richey,[26] and others resulted in the belief that most prospective teachers are interested in professional advancement. Since this interest appeared high on most lists yet never was paramount, it was felt that it would appear in both factors mentioned.

2. The Ranking Questionnaire

The hypothesis was made that in factoring the results from the ranking questionnaire, variables of service to society, desire for professional advancement, and prestige and respect of the profession would appear on each of the factors.

The hypothesis was further made that the following factors would be defined:

1. A factor concerned with security and financial reward.

2. A factor concerned with ease of getting education and a job.

3. A factor concerned with lack of physical strain, frequent vacations and short working hours.

Studies of Bordin,[27] Berdie,[28] and remarks of Harris, Bettelheim, and Diederich[29] indicate difficulties in getting interpretable test results. The ranking questionnaire allowed time to think carefully and weigh answers, since no time pressure was utilized in the administration. This permitted the subjects to make deliberately misleading answers, if such was their desire. That this can and has often been done is well known. In the case of these subjects the rapport between examiner and subjects was considered excellent, and it is questionable, therefore, whether deliberately "cooked" answers were made to test questions. The directions stipulated orally that data would not be used "against the students" in any way, pure research being the object of the inquiry. Nevertheless, with students hoping to get a teaching situation at the end of the school year, it was possible that some subjects felt that it was to their advantage to appear close to the stereotype of the ideal teacher—that is, to apparently have a desire to serve society, to indicate that the profession holds prestige and respect, and to show that they are interested in professional advancement. If this was the case, these interests should appear generally in all factors.

If students were honest in answering, it might be found that interests in security and financial reward, ease of getting necessary education and a position, and lack of physical strain, short hours, and frequent vacations were grouped in the nature of factors, these interests being frequently mentioned in studies already mentioned.

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22. Tressa Yeager, An Analysis of Certain Traits of Selected High School Seniors Interested in Teaching, Contributions to Education, No. 660 (New York: Teachers College, Columbia University, 1935).

23. W. B. Tudhope, "Motives for the Choice of the Teaching Profession," British Journal of Educational Psychology, XIV (November 1944), pp. 119-141.

24. A. S. Lee, "Motives of High School Graduates for Entering the Profession of Teaching," School Review, XXXVI (January 1928), pp. 16-24.

25. G. Gould, "Motives for Entering the Teaching Profession," Elementary School Journal, XXXV (October 1934), pp. 95-102.

26. W. H. Fox and R. W. Richey, An Analysis of Various Factors Associated with the Selection of Teaching as a Vocation, Bulletin of the School of Education, No. 3 (Bloomington, Indiana: Indiana University, 1948).

27. E. S. Bordin, "A Theory of Vocational Interests as Dynamic Phenomena," Educational and Psychological Measurement, III (1943), pp. 49-65.

28. R. F. Berdie, "Factors Associated with Vocational Interests," Journal of Educational Psychology, XXXIV (May 1943), pp. 257-277.

29. C. W. Harris, B. Bettelheim, and P. Diederich, "Aspects of Appreciation," in E. R. Smith and R. W. Tyler, Appraising and Recording Student Progress (New York: Harper and Brothers, 1942), Ch. 4.

C. Presentation of Results from Factoring

1. The Paired-Comparison Test

1.1 Data from Men's Group

Intercorrelations of scores obtained for each variable and residuals after removing six factors are shown in Table VI. It is believed that the excess of negative over positive correlations is not unusual, due to the element of circularity inherent in this form of test. Since each item was paired with every other item, only one item could have a maximum score of twelve, this producing several low scores for each relatively high score.

The centroid factor matrix and computed communalities are shown, together with reliabilities computed by the Kuder-Richardson formula, in Table V. Variables 1 and 3 contribute most to the variance of the factors. They are respectively "security against job loss and layoffs" and "relatively good financial reward for a lifetime of work." Variables with lowest communalities are 13 ("lack of physical strain in teaching"), 11 ("variety of activities, little monotony"), and 4 ("clean, attractive physical surroundings"). These are also the variables of lowest reliability, except that variable 12 ("environment of interesting co-workers") is slightly lower than variable 13.

The simple axis factor structure (V) is shown in Table VIII. For more convenient study, this structure has been portrayed schematically in Table XI in which variables having factor loadings of .200 to .399 are marked "X" and those above .399 with "XX".

Thurstone's[30] criteria for simple structure indicate that there should be a variable of complexity one for each column of the structure matrix. Three such variables exist in this matrix. They are variables 8 ("prestige and respect of the profession"), present only in factor C, variable 10 ("opportunity to pursue a favorite interest") present in Factor D, and variable 13 ("lack of physical strain"), present in Factor F. This failure to provide six variables of complexity one is due to radial rotation. A different simple axis structure was obtained through methods described, but presence of large negative factor loadings seemed undesirable for purposes of interpretation, leading to further rotation. Thus an ideal solution has not been obtained, this analysis being in the nature of a compromise among criteria.

For convenience, the factors are shown in Table VII, with only variables and loadings which were higher than .199.

1.2 Factors Interpreted From V

Factor A. This factor may be termed "Interest in Security." Variables 1, 2, and 3 characterize this factor although each is present in at least two other factors. Variable 1 is of complexity four, and appears in Factor F with higher loadings than on Factor A. In Factor A, however, variable 1 is accompanied by variables 2 and 3, or a character tending to indicate interest in making sure of at least a moderate financial reward, whereas in factor F, it is accompanied by variables 6 and 13, indicating interest in advancement and lack of physical strain, rather than in security. Variable 3, indicating interest in security against job loss, appears also in factors D and E, but in factor D, variables 5 and 10 indicate that it is an accompaniment of a desire for pleasant but easy work, whereas in Factor E, variables 7, 9 and 12 indicate that it is an accompaniment of interest in people. Variable 2, in combination with variables 1 and 3, seems to indicate that interest in ease of getting necessary education is an economic interest, not one of subject matter difficulty. Variable 4, interest in clean and attractive physical surroundings, is lightly loaded in comparison with variables 1, 2, and 3, but is consistent with the idea of a secure, fairly well paying position.

Factor B. This factor might be termed "Interest in Working Conditions". Interest is shown in clean, attractive physical surroundings, and short working hours, with frequent vacations. "Opportunity for advancement" and "relatively good financial reward" show that this interest in good working conditions is partly economic in character. Teaching is evidently regarded by people conforming to the pattern of this factor as a position of relative comfort and ease.

Factor C. This factor might be termed "Self Esteem". Variable 8, of complexity one, distinguishes this factor from all others. Variable 7 is of complexity two and is found on factor E, but is the only variable common to factors C and E. People having interests corresponding to this factor desire to serve society and feel that the profession has respect and prestige, if at the same time they are granted short working hours and frequent vacations. A dilettante attitude seems indicated.

Factor D. This might be termed a factor of "Academic Interests." Variable 10 is of complexity one and is heavily loaded in comparison with other variables in this factor. In addition, variable 11 also appears. Short working hours (variable 5) may be interpreted as a chance to pursue a study or academic interest. The secur-

30. Thurstone, op. cit.

TABLE VII

CENTROID FACTOR MATRIX AND TABLE OF COMMUNALITIES—F

Var.	I	II	III	IV	V	VI	Commun-ality	Relia-bility
1	561	281	391	-129	-402	046	.727	.86
2	246	378	426	311	-037	-209	.520	.69
3	661	142	-244	340	-316	-208	.775	.84
4	303	372	156	-224	283	-049	.387	.66
5	409	-444	205	279	322	088	.596	.84
6	358	220	154	-446	181	114	.445	.78
7	528	-532	166	-082	-100	-075	.612	.93
8	234	-423	399	302	-249	147	.568	.75
9	478	-398	-460	-119	104	-167	.651	.85
10	252	155	-459	318	281	154	.052	.76
11	384	132	-316	-132	116	-125	.315	.64
12	511	-353	-312	-378	-079	018	.633	.71
13	136	473	-111	-025	-107	295	.354	.72

TABLE VIII

MEN'S PAIRED-COMPARISON TEST STRUCTURE MATRIX—V

Var.	A	B	C	D	E	F
1	517	304	154	-071	290	588
2	617	394	095	300	032	086
3	563	-005	081	518	610	073
4	314	531	-030	160	023	384
5	-041	338	637	398	-025	-023
6	132	467	035	-064	051	564
7	057	180	377	075	399	111
8	000	000	550	000	000	000
9	-041	-004	080	314	545	-047
10	000	000	191	539	000	000
11	197	154	-092	283	350	161
12	-100	000	091	000	512	262
13	109	000	-004	000	-090	406

TABLE IX

MATRIX OF DIRECTION COSINES—λ—MEN'S PAIRED-COMPARISON TEST

Factor	A	B	C	D	E	F
A	462	468	431	484	536	505
B	520	229	-371	120	-129	368
C	258	541	308	-238	-329	212
D	196	-165	424	629	-184	-488
E	-162	616	191	471	-396	-072
F	-621	-171	605	-279	-630	567

TABLE X

INTERCORRELATIONS OF FACTORS—ϕ—MEN'S PAIRED-COMPARISON TEST

Factor	A	B	C	D	E	F
A	1.000					
B	- .415	1.000				
C	.373	- .031	1.000			
D	- .374	- .289	- .550	1.000		
E	- .437	.344	.230	- .172	1.000	
F	- .137	- .421	- .425	.565	- .144	1.000

TABLE XI

SCHEMATIC DIAGRAM OF MEN'S PAIRED-COMPARISON TEST

Var.	A	B	C	D	E	F
1	XX	X			X	XX
2	XX	X		X		
3	XX			XX	XX	
4	X	XX				X
5		X	XX	XX		
6		XX				XX
7			X		XX	
8			X			
9				X	XX	
10				XX		
11				X	X	
12					XX	X
13						XX

TABLE XII

MEN'S PAIRED-COMPARISON TEST FACTOR LOADINGS OF .200 AND ABOVE

Factor	Variables	Loadings	Reasons
A	2	.617	Ease of getting necessary education
	3	.563	Security against job loss and layoffs
	1	.517	Relatively good financial reward
	4	.314	Clean, attractive physical surroundings
B	4	.531	Clean, attractive physical surroundings
	6	.467	Opportunity for professional advance
	2	.394	Ease of getting necessary education
	5	.338	Short working hours, frequent vacations
	1	.304	Relatively good financial reward
C	5	.637	Short working hours, frequent vacations
	8	.550	Prestige and respect of profession
	7	.377	Opportunity to serve society
D	10	.539	Opportunity to pursue favorite interest
	3	.518	Security against job loss and layoffs
	5	.398	Short working hours, frequent vacations
	9	.314	Ease of getting a job
	2	.300	Ease of getting necessary education
	11	.283	Variety of activities, little monotony
E	3	.610	Security against job loss and layoffs
	9	.545	Ease of getting a job
	12	.512	Environment of interesting co-workers
	7	.399	Opportunity to serve society
	11	.350	Variety of activities, little monotony
	1	.290	Relatively good financial reward
F	1	.588	Relatively good financial reward
	6	.564	Opportunity for professional advancement
	13	.406	Lack of physical strain
	4	.384	Clean, attractive physical surroundings
	12	.262	Environment of interesting co-workers

ity variables (3, 9, 2) are in line with studies previously mentioned regarding the apparent conflict between interests in subject matter and in people.

Factor E. This might be termed an "Interest in People" factor since variables 12, 7, and 11 are all present. All of these variables are of complexity two and more heavily loaded in factor E than in other factors. The relatively high loadings of variables 3 and 9 seem to indicate that this interest is concerned with security also. Persons having an interest pattern corresponding to this factor like to work with people, but are not inclined to take presumably more risky positions such as sales work.

Factor F. This factor might be called "Self-Interest." Persons corresponding in interests to this pattern of variables are concerned with financial reward, professional advancement, and working conditions. "Practicality" is perhaps another equally good name for this factor. Variable 6, "opportunity for professional advancement", is of complexity two as is variable 12, "environment of interesting co-workers." Variable 13, "lack of physical strain," is of complexity one, and aids in distinguishing this factor from all others.

1.3 Data From Women's Group

Factoring results from the Women's Paired-Comparison Test are shown in Tables XIII to XVIII. It will be seen that variables 3 ("security") and 1 ("financial reward") have the highest communalities. Variables 13 ("physical strain") and 2 ("ease of getting education") have lowest communalities. However, whereas variable 13 has a low reliability as well as communality, variable 2 has high reliability, indicating that this variable contains much specificity, as is also the case with variable 12 ("environment of interesting co-workers"). Variable 8 ("prestige and respect of profession") shows more communality than reliability. This may be accounted for when it is remembered that the reliability is merely estimated and that the estimate is likely to be low, especially since the number of cases is only thirty-seven.

Variable 8 appears in all factors except C, and it cannot therefore be used very well for differentiating between factors.

1.4 Factors Interpreted From Women's V

Factor A. This might be termed an "Interest in Public Welfare" factor. Variables 1 and 7, both of complexity two, have higher loadings on factor A than on the other factors. In factor A, variable 1 ("financial reward") accompanies variable 7 ("opportunity to serve society") whereas in factor E it accompanies variable 6 ("opportunity for professional advancement") thus indicating emphasis in the first case on moderate reward, and in the second case emphasis on increasing this reward. Variables 7 and 8 indicate interests in welfare and uplift, and variables 1 and 3 in security. This is consonant with desire to serve to society.

Factor B. This factor might be termed "Interest in Security." Variables 3 and 9 have the highest loadings. Whereas variable 3 appears also in factors A and C, it has much higher loading in factor B than in the others. All the other variables with the exception of 13 are of complexity four or five. Variable 13, "lack of physical strain", can be interpreted as "security for health" and since women are known to be less capable of heavy physical work than men, this interpretation appears plausible.

Factor C. This factor might be termed "Interest in Personal Pleasure." Variable 11, "interest in variety of activities", is of complexity one and distinguishes this factor from all others. Variable 10, "interest in subject matter", has a higher loading on factor C than on any other factor. Clean, attractive physical surroundings, relative ease of getting necessary education and a position, plus security, would appear to be consonant with personal pleasure in teaching.

Factor D. This factor might be termed "Interest in Teaching as a Worthwhile Profession." Opportunity for professional advancement is stressed, as is the prestige and respect of the profession. Short working hours and frequent vacations may be used for study. Opportunity to pursue a favorite interest in this case seems to refer to an interest in teaching and professional activities, rather than in the subject matter taught—that is, in the technicalities of Education. Variable 6 is of complexity two, being found only on one other factor, E. Factor E, however, includes emphasis on financial reward, and a negative loading on variable 12, environment of interesting co-workers.

Factor E. This factor might be termed "Aggressiveness." The negative of variable 12 ("environment of interesting co-workers") is of complexity one and distinguishes this factor from all others. "Professional advancement" is heavily loaded as is "prestige and respect of the profession." The type of interest pattern here seems to indicate a desire to get ahead in the profession, demand respect and assume prestige, even at the "expense of the other fellow".

Factor F. This factor might be termed "Interest in Agreeable Working Conditions." The point of reference seems to be the environment of the position, rather than the specific duties of the individuals. Emphasis on physical surroundings, lack of physical strain, and prestige and respect of the profession seem to indicate interest in the atmosphere of teaching. In addition,

TABLE XIII

WOMEN'S PAIRED-COMPARISON TEST INTERCORRELATIONS AND RESIDUALS—R

Var.	1	2	3	4	5	6	7	8	9	10	11	12	13
1	-110	-014	-073	142	011	-047	-053	033	021	096	012	-056	-072
2	-110		-141	116	045	-003	028	-042	-020	-051	124	-099	-060
3	164	-156		-005	007	100	-042	036	023	054	039	-053	065
4	-215	-014	-176		-105	-159	174	-057	-040	-054	-011	062	-079
5	-060	245	-125	-295		008	-013	-020	-114	-113	042	-016	169
6	017	-284	-034	104	-434		-025	129	-089	-058	-067	012	218
7	-396	-058	-091	-213	-298	048		-031	114	086	015	-033	-193
8	-130	-111	-087	-055	000	564	-137		078	-016	-057	065	-123
9	-202	318	288	053	062	-237	-154	-141		005	-025	027	011
10	096	-248	-201	-373	-132	-081	-083	073	-422		-076	101	-026
11	-179	-321	-267	-288	110	-235	150	-270	-197	275		012	-010
12	011	-120	-344	121	-224	-064	163	-383	-221	-055	044		015
13	000	-125	000	-143	-023	-252	-273	463	-240	246	000	-102	

TABLE XIV

CENTROID MATRIX AND TABLE OF COMMUNALITIES—F

Var.	I	II	III	IV	V	VI	Communality	Reliability
1	.189	-.318	.463	.543	.222	.180	.728	.76
2	.457	-.074	-.182	-.165	-.248	.130	.353	.72
3	.382	.332	.374	-.099	.547	.174	.735	.76
4	.158	.335	-.265	.410	-.356	-.099	.512	.49
5	.356	-.475	.120	-.421	-.277	-.183	.654	.85
6	.310	-.605	-.277	-.305	.072	.189	.648	.85
7	.351	-.217	.436	.176	-.209	-.258	.502	.88
8	.335	-.322	-.606	.170	.474	.089	.845	.65
9	.605	.247	-.172	-.260	.093	-.087	.540	.87
10	.497	.397	-.233	-.039	-.186	.057	.498	.75
11	.385	.364	.235	.196	-.312	.357	.599	.79
12	.176	.150	.422	-.393	.029	-.223	.437	.81
13	.229	.184	-.362	.188	.182	-.167	.314	.40

TABLE XV

WOMEN'S PAIRED-COMPARISON TEST STRUCTURE MATRIX—V

Var.	A	B	C	D	E	F
1	633	-040	-002	000	461	016
2	-069	082	386	493	172	117
3	308	612	250	000	000	-050
4	000	000	218	000	000	456
5	025	-122	000	556	000	000
6	060	036	067	655	484	-107
7	435	-089	-027	196	-002	237
8	357	483	-064	580	747	353
9	056	565	306	473	000	322
10	-092	334	490	301	-016	321
11	000	000	668	000	000	006
12	000	165	000	000	-431	-068
13	178	407	-020	190	164	456

TABLE XVI

WOMEN'S PAIRED-COMPARISON TEST—MATRIX OF DIRECTION COSINES - λ

Factor	A	B	C	D	E	F
A	445	551	490	779	339	491
B	-313	371	354	-463	-554	133
C	290	-204	006	-368	-345	-346
D	586	-095	-068	-200	445	443
E	441	689	-344	-033	279	010
F	-286	-184	715	-046	428	-652

TABLE XVII

WOMEN'S PAIRED-COMPARISON TEST—INTERCORRELATIONS OF FACTORS—Φ

Factor	A	B	C	D	E	F
A	1.000					
B	- .246	1.000				
C	.335	- .183	1.000			
D	.202	- .187	- .165	1.000		
E	- .571	.170	- .204	- .517	1.000	
F	- .412	- .256	.154	- .381	.281	1.000

TABLE XVIII

SCHEMATIC DIAGRAM OF WOMEN'S PAIRED-COMPARISON TEST

Var.	A	B	C	D	E	F
1	XX				XX	
2			X	XX		
3	X	XX	X			
4			X		XX	XX
5				XX		
6				XX	XX	
7	XX				X	X
8	X	XX		XX	XX	X
9		XX	X	XX		X
10		X	XX	X		X
11			XX			
12					-XX	
13		XX				XX

TABLE XIX

WOMEN'S PAIRED-COMPARISON TEST FACTOR LOADINGS OF .200 AND ABOVE

Factor	Variables	Loadings	Reasons
A	1	.633	Relatively good financial reward
	7	.435	Opportunity to serve society
	8	.357	Prestige and respect of profession
	3	.308	Security against job loss and layoffs
B	3	.612	Security against job loss and layoffs
	9	.565	Ease of getting a job
	8	.483	Prestige and respect of the profession
	13	.407	Lack of physical strain
	10	.334	Opportunity to pursue a favorite interest
C	11	.668	Variety of activities, little monotony
	10	.490	Opportunity to pursue a favorite interest
	2	.386	Ease of getting necessary education
	9	.306	Ease of getting a job
	3	.250	Security against job loss and layoffs
	4	.218	Clean, attractive physical surroundings
D	6	.655	Opportunity for professional advancement
	8	.580	Prestige and respect of the profession
	5	.556	Short working hours, frequent vacations
	2	.493	Ease of getting necessary education
	9	.473	Ease of getting a job
	10	.301	Opportunity to pursue a favorite interest
E	8	.747	Prestige and respect of the profession
	6	.484	Opportunity for professional advancement
	1	.461	Relatively good financial reward
	12	-.431	Negative of environment of interesting co-workers
F	4	.456	Clean, attractive physical surroundings
	13	.456	Lack of physical strain
	8	.353	Prestige and respect of the profession
	9	.332	Ease of getting a job
	10	.321	Opportunity to pursue a favorite interest
	7	.237	Opportunity to serve society

teaching is considered a service to society and one can pursue a favorite subject matter interest. Whereas factor C seemed to have the activities as a reference, factor F seems to focus on the environment of teaching.

1.5 Comparison with Hypothesis in Regard to Paired-Comparison Tests

The hypothesis indicated that a factor of interest in people and in professional advancement should be found. Factor E in the men's test comes close to substantiating this part of the hypothesis, since "environment of interesting co-workers" and "opportunity to serve society" are both present. This factor, however, does not include "opportunity for professional advancement."

In the women's test, factor A included "opportunity to serve society" but omitted "professional advancement." Factors including "advancement" were lacking in variables concerning interest in people.

Apparently, for those intending to teach, desire for professional advancement is entirely different from interest in people and desire to serve society.

The hypothesis also involved expectations of a factor containing "opportunity to pursue a favorite interest", "security against job loss and layoffs", and "opportunity for professional advancement."

For the men, Factor D comes close to the hypothesis, but again, opportunity to advance does not accompany the other interests mentioned. Opportunity for professional advancement does not seem linked with security in any factor.

In the women's test, factor C comes closest to the hypothesis. Here again the interest in advancement does not accompany interest in subject matter and security. Factor E indicates interest in advancement but does not carry interest in security or subject matter.

2. The Ranking Questionnaire

2.1 Data From Men's Group

Intercorrelations and residuals from the Ranking Questionnaire are shown in Table XX. There are many negative correlations, again, as in the Paired-Comparison Test, because only one variable could be chosen for highest rank and others would necessarily be lower. If all subjects did not choose the same items for higher ranks, negative correlations would occur.

The centroid factor matrix and communalities are shown in Table XXI. In this instrument, reliabilities were unknown, so that no comparison with communalities is possible. Variables 1, 2, 3, and 5 are of highest communality, and variables 13, 6 and 10 of lowest. The spread between highest and lowest communality is .297, indicating that all variables contributed in quite similar amounts to the variance of the factors.

The simple axis structure matrix is shown in Table XXII, and for convenience, a schematic diagram of this structure is shown in Table XXV, using variables with loadings of .200-.399 as "X" and above .399 as "XX".

2.2 Factors Interpreted From V

Factor A. This factor might be termed "Academic Interest". Variable 10, "opportunity to pursue a favorite interest," is of complexity one and differentiates this factor from all others. Variable 2, "ease of getting necessary education," and variable 11, "variety of activities and little monotony," are of complexity two, and all others are of complexity three or more. Variable 5, interest in "short working hours and frequent vacations," has high loadings in factors B and D as well as in factor A. In factor A this variable seems to indicate an interest in the pleasure aspect of short working hours and frequent vacations but in factor B and factor D, the accompanying variables seem to show that the interest in short working hours and frequent vacations is along the line of study or work in connection with the teaching position.

The variables in this factor all are concerned with pleasure or ease.

Factor B. This might be termed an "Interest in Working in a Social Atmosphere" factor. Variable 11, "variety of activities, little monotony," is of complexity two and has a smaller loading in factor A. The presence of variables 5, 9, and 3 ("short working hours," "ease of getting a job," "security against job loss") seem to indicate an economic interest in this factor. However, variables 11, "variety of activities," 12, "environment of interesting co-workers," and 7, "opportunity to serve society", indicate that pleasure in working among and with people is important. Variable 3, "security", is of complexity five.

Factor C. This factor might be termed "White Collar Interests." Variable 1, "financial reward", is of complexity two and has the highest loading of any variable on this factor. Variable 13, "lack of physical strain", is of complexity one. Since lack of physical strain, clean and attractive physical surroundings, environment of interesting co-workers, security, financial reward, and prestige of the profession are all present, it is believed that a sort of "white collar" interest is indicated.

Factor D. This factor might be termed "Interest in Public Welfare". Variable 8 is of complexity two, all others having complexity three or more. The differentiation between this factor and the others is in the arrangement of variables,

TABLE XX

INTERCORRELATIONS OF MEN'S RANKING QUESTIONNAIRE — R

Var.	1	2	3	4	5	6	7	8	9	10	11	12	13
1		-941	-003	-064	062	-005	002	-061	042	104	-038	006	-018
2	294		062	-075	060	-068	017	-041	032	046	-069	-005	091
3	124	-264		143	-029	082	-001	-010	-066	-165	-062	-057	016
4	063	146	148		029	-020	-086	023	024	-017	-115	084	-053
5	-124	-018	-030			077	050	-014	-047	-080	014	-067	-010
6	-011	-283	-267	-245	004		001	-060	026	070	-092	007	012
7	-489	-299	-136	-182	-248	166		-071	012	046	-033	-035	054
8	-317	-213	-117	-209	-195	119	296		029	022	046	080	-023
9	240	367	033	051	024	-287	-353	-048		-049	025	017	-067
10	094	-206	-217	-267	-139	052	-235	-094	-109		155	-058	-058
11	-153	-081	-279	-206	-105	-124	025	-139	-343	-011		053	015
12	-436	-360	-081	-159	-142	-050	335	-098	-405	-025	300		093
13	-226	005	-199	-069	096	-260	-073	-030	030	-052	200	079	

TABLE XXI

CENTROID FACTOR MATRIX—MEN'S RANKING QUESTIONNAIRE—F

Var.	I	II	III	IV	V	VI	Communality
1	551	355	-347	220	188	-227	.685
2	498	409	242	-250	-025	-273	.612
3	409	-447	-206	412	-235	278	.712
4	476	-268	338	206	-107	-231	.520
5	230	-154	250	-245	531	409	.648
6	280	181	323	137	-458	194	.481
7	548	386	-076	151	200	198	.557
8	331	187	291	397	260	120	.469
9	550	258	-117	-330	-246	154	.576
10	190	-371	375	-244	-199	-220	.462
11	402	-358	-381	-293	-139	096	.549
12	529	131	-314	-320	081	-168	.533
13	151	-309	-375	162	152	-333	.419

TABLE XXII

SIMPLE AXIS STRUCTURE MATRIX—V

Var.	A	B	C	D	E	F
1	-040	094	575	166	507	135
2	362	-024	037	051	671	000
3	-018	412	548	209	-389	402
4	390	-023	423	242	-020	192
5	498	509	-065	671	012	-629
6	-018	041	-017	-021	012	440
7	035	322	335	399	373	013
8	048	028	344	528	013	-017
9	225	436	-006	-038	515	149
10	520	-015	-042	-019	-006	-005
11	308	549	183	-030	117	033
12	313	328	220	021	597	-076
13	051	000	487	010	-017	024

TABLE XXIII

MATRIX OF DIRECTION COSINES—λ

Factor	A	B	C	D	E	F
A	520	517	587	425	464	129
B	-410	-247	-233	-153	611	115
C	413	-288	-276	328	-131	-151
D	-548	-320	646	235	-506	485
E	262	121	190	704	103	-838
F	-149	687	-267	371	-358	-097

TABLE XXIV

INTERCORRELATIONS OF FACTORS—Φ

Factor	A	B	C	D	E	F
A	1.000					
B	- .204					
C	- .055	.151				
D	- .115	- .344	- .642			
E	- .289	- .074	- .181	.343		
F	.292	- .148	- .610	.641	.206	

TABLE XXV

SCHEMATIC DIAGRAM OF STRUCTURE

Var.	A	B	C	D	E	F
1			XX		XX	
2	X				XX	
3		XX	XX	X	-X	XX
4	X		XX	X		
5	XX	XX		XX		-XX
6						XX
7		X	X	XX	X	
8			X	XX		
9	X	XX			XX	
10	XX					
11	X	XX				
12	X	X	X		XX	
13			XX			

since while most of the variables are of complexity three, this factor shares only two of them with any other factor except factor B. These factors are different, however, since Factor D includes variables 8 not present in B, and factor D lacks variables 9, 10, and 12, present in B. In this factor, interest in serving society is paramount, but prestige and respect are interesting to individuals with this pattern also. Furthermore, short working hours and frequent vacations are desired. This appears much like the interest of the stereotyped volunteer welfare worker, who wants to "do his bit" if not too much trouble to him and if he gets the proper credit for so doing.

Factor E. This factor might be termed "Interest in Expediency." Variable 2, "ease of getting education", and variable 1, "financial reward", are of complexity two. Variable 3, "security against job loss and layoffs" has a negative loading. This is unusual, but can be explained by characterizing this factor as one of not expecting to make teaching a life's work. That is, teaching seems more like a sort of "insurance policy" to fall back upon. Coupled with interest in ease of getting education, ease of getting a position, and fair financial reward, interest in teaching seems to be in a belief that teaching is an expedient, not a career.

Factor F. This factor might be termed "Interest in Professional Advancement." The negative of variable 5, "short working hours," is present. Variable 6, "opportunity for professional advancement," is of complexity one and distinguishes this factor from all others. Variable 3, "security," is of complexity five.

2.3 Data From Women's Group

Correlations and residuals are shown in Table XXVII, and the centroid factor matrix and communalities in Table XXVIII.

Variables 3, 4, and 11 have the highest communalities. Examination of the structure matrix, Table XVIII indicates that variable 3 does not distinguish well between factors since it appears on five of the six factors. Variables 4 and 11, however, are of complexity three, with substantial loadings on each of the factors in which they appear. Lowest communalities are those of variables 12 and 6. These are "environment of interesting co-workers" and "opportunity for professional advancement", indicating that if reliabilities were nearly equal to communalities, women do not believe, or are not interested in teaching as a means for meeting friends or for advancement. This is in correspondence with the expressed views of beginning women teachers visited as a part of this study.

2.4 Factors Interpreted from Structure Matrix

Factor A. This might be called a factor of "Economic Interest." Variable 1, financial reward, is of complexity two, shared only by factor E in which it is of smaller loading. Also present are interests in security and professional advancement. Variable 4, interest in clean and attractive physical surroundings, is of complexity three and tends to indicate that the factor is similar to the white collar stereotype in that surroundings are important. However, since this variable is common also to factors D and F, it does not characterize this factor.

Factor B. This might be termed an "Interest in Public Welfare," factor. "Opportunity to serve society," "prestige and respect of the profession," and "opportunity for professional advancement" seem to indicate a desire for welfare and uplift. Variable 8 is of complexity two and is found also in Factor F, the "expediency" factor. Variable 5 is also of complexity two, but has one of the smaller loadings on this factor.

Factor C. This factor might be called "Social Interest." Variable 13, "lack of physical strain," is of complexity one, and is second highest of the variables present in this factor. Both variables of interest in people and subject matter (7, 12, 10) are present. Variable 3, "security," is also found in four other factors.

Factor D. This factor might be called "Interest in Pleasurable Activities." While variable 3, security, is highest, its nature has already been discussed. Emphasis on pleasant surroundings, variety of activities, interest in co-workers, and favorite subject matter interests indicate that teaching is regarded as pleasurable. Factors C and D contain several common variables but factor C contains variables 13 and 9, not present in D, and factor D contains variable 4, not present in C. In both factors interests in people and subject matter are indicated, but there in factor C emphasis is given lack of physical strain, in factor D the emphasis is on surroundings.

Factor E. This factor might be termed "Interest in Security." Variables 1, 9, and 2 plus the almost general variable 3 indicate interest in security and economic stability. The interest in getting education and a position as easily as possible, indicates, in company with variables of security and financial reward, desire to further economic interests rather than to avoid work.

Factor F. This factor might be termed "Interest in Expediency." Variable 5, "short working hours," is of complexity two and has a much higher loading on factor F than on factor B. Variable 2, "ease of getting education", has higher loading on factor F than on factors A and E where it is also present. Variable 8 is of complexity two. This is the only factor in which "security" is not present, leading to the belief that this interest is one of temporary character. Teaching, in terms of this factor, is an easy, pleasant job, but not to be undertaken as life work.

TABLE XXVI

FACTORS RESULTING FROM MEN'S RANKING QUESTIONNAIRE

Factor	Variables	Loadings	Reasons
A	10	.520	Opportunity to pursue a favorite interest
	5	.498	Short working hours, frequent vacations
	4	.390	Clean, attractive physical surroundings
	2	.362	Ease of getting necessary education
	12	.313	Environment of interesting co-workers
	11	.308	Variety of activities, little monotony
	9	.225	Ease of getting a job
B	11	.549	Variety of activities, little monotony
	5	.509	Short working hours, frequent vacations
	9	.436	Ease of getting a job
	3	.412	Security against job loss and layoffs
	12	.328	Environment of interesting co-workers
	7	.322	Opportunity to serve society
C	1	.575	Relatively good financial reward
	3	.548	Security against job loss and layoffs
	13	.487	Lack of physical strain
	4	.423	Clean, attractive physical surroundings
	8	.344	Prestige and respect of the profession
	7	.335	Opportunity to serve society
	12	.220	Environment of interesting co-workers
D	5	.671	Short working hours, frequent vacations
	7	.528	Opportunity to serve society
	8	.399	Prestige and respect of the profession
	4	.242	Clean, attractive physical surroundings
	3	.209	Security against job loss and layoffs
E	2	.671	Ease of getting necessary education
	12	.597	Environment of interesting co-workers
	9	.515	Ease of getting a job
	1	.507	Relatively good financial reward
	3	-.389	Security against job loss and layoffs — negative of
	7	.373	Opportunity to serve society
F	5	-.629	Negative of short working hours, frequent vacations
	6	.440	Opportunity for professional advancement
	3	.402	Security against job loss and layoffs

TABLE XXVII

CORRELATIONS OF WOMEN'S RANKING QUESTIONNAIRE TEST RESULTS

Var.	1	2	3	4	5	6	7	8	9	10	11	12	13
1		-019	-015	058	058	108	085	-046	-159	-033	-071	025	-004
2	-097		-052	050	043	002	048	-061	-017	126	-055	-059	-027
3	002	-171		080	-047	098	068	-033	-066	040	-148	-040	137
4	-074	-045	473		-050	-071	-090	025	086	-001	088	-066	-050
5	067	337	093	224		-092	-060	-059	143	056	022	-042	-085
6	165	-180	-183	-176	-176		-050	044	-113	-106	085	035	-085
7	-057	-127	-332	-319	-416	089		107	021	-015	012	-137	-045
8	076	-193	001	-207	-361	130	308		-051	-003	-056	005	038
9	-323	032	098	-134	-005	-104	-372	-331		038	010	109	-019
10	-235	-338	-188	-059	-161	-146	001	-181	-026		-040	-018	013
11	044	-052	-477	-326	-059	-144	082	-117	047	116		117	149
12	-288	-068	-152	-229	-245	-078	-077	-087	-031	300	072		-041
13	-202	257	-313	-258	038	-128	-141	-121	164	-065	-510	-083	

TABLE XXVIII

CENTROID FACTOR MATRIX OF WOMEN'S RANKING QUESTIONNAIRE—F

Var.	I	II	III	IV	V	VI	Communality
1	180	356	-240	442	-288	208	.538
2	440	177	417	-149	-394	-052	.579
3	461	-583	-475	098	038	-178	.821
4	488	-414	-352	-266	-189	264	.710
5	553	112	202	-460	091	051	.588
6	277	250	-192	071	-250	-083	.251
7	521	140	-199	-143	296	-078	.445
8	416	453	-202	-319	217	198	.607
9	366	335	-224	130	198	-359	.481
10	253	-317	430	-117	-106	-365	.508
11	394	-376	131	441	202	344	.667
12	214	-370	266	-141	096	-075	.288
13	324	243	438	426	171	128	.583

TABLE XXIX

SIMPLE AXIS STRUCTURE MATRIX—V

Var.	A	B	C	D	E	F
1	445	047	039	-064	391	-016
2	280	-004	046	051	260	550
3	424	429	447	837	349	-062
4	580	194	052	683	026	400
5	036	303	080	183	-054	708
6	298	238	-011	045	388	190
7	014	595	252	242	159	353
8	000	496	-092	-065	-050	563
9	-055	615	267	030	457	081
10	000	-045	293	295	175	155
11	304	-079	648	504	016	-076
12	-015	-029	267	335	-079	134
13	000	-042	493	-070	150	067

TABLE XXX

MATRIX OF DIRECTION COSINES—λ

Factor	A	B	C	D	E	F
A	483	538	561	616	453	627
B	-217	254	-323	-748	160	274
C	-283	-531	219	-234	-209	169
D	228	-142	584	056	470	-646
E	-697	406	399	-045	-404	-180
F	319	-423	-179	-013	-584	230

TABLE XXXI

INTERCORRELATIONS OF FACTORS—Φ

Factor	A	B	C	D	E	F
A	1.000					
B	.647	1.000				
C	.488	.221	1.000			
D	- .749	- .498	- .676	1.000		
E	- .735	- .665	- .474	.525	1.000	
F	- .432	- .492	.037	.178	.398	1.000

TABLE XXXII

SCHEMATIC STRUCTURE DIAGRAM

Var.	A	B	C	D	E	F
1	XX				X	
2	X				X	XX
3	XX	XX	XX	XX	X	
4	XX			XX		XX
5		X				XX
6	X	X			X	
7		XX	X	X		X
8		XX				XX
9		XX	X		XX	
10			X	X		
11	X		XX	XX		
12			X	X		
13			XX			

2.5 Comparison of Factors with Hypothesis

The hypothesis was made that in factoring the results from the ranking questionnaire, variables of service to society, desire for professional advancement, and prestige and respect of the profession would exist on all factors. This part of the hypothesis was disproved. The only interest approaching the common factor concept has that of variable 3, "security." This was present in factoring both the men's and women's questionnaires, of complexity five.

The hypothesis also indicated that factors of security and financial reward; ease of getting education and positions; lack of physical strain, short hours, and frequent vacations, and pleasant physical surroundings would be present as group factors.

It has been shown that interest in security could almost be termed a common factor. The factors A, for the men, and F for the women, correspond to the predicted factors of short hours, frequent vacations, attractive physical surroundings. Lack of physical strain as an interest appears in factor C for both men and women, but is not co-existent with interests in short hours, ease of getting positions, or desire for attractive physical surroundings. Some substance was given the part of the hypothesis concerning group factors, but correspondence between factors and hypothesis was not close enough to be considered as substantiating the hypothesis.

D. Comparison of Results of Factoring

D.1 Men's and Women's Paired-Comparison Test

For convenience in comparing factor structures of the men's and women's paired-comparison test, Table XXXIV shows only variable loadings of .200 or higher. It is readily apparent that there is little likeness between the two structures. The only factors having more than three variables with loadings of .200 or more in common with each other are factors D of the men's test and C of the women's test. These were termed, respectively, "Academic Interest" and "Interest in Personal Pleasures." It will be noted that each factor has values in this table for variables 2, 3, 9, 10 and 11. However, factor D of the men's test has a value for variable 5, and factor C of the women's test has a value for variable 4. Furthermore, whereas the highest values present in factor D (men's test) are those of variables 10 and 3, the highest values for factor C (women's test) are those of variables 11 and 10. In the case of the men, "opportunity to pursue a favorite interest" has only slightly higher factor loading than security against job loss and layoffs. For women, however, "variety of activities with little monotony", has a considerably higher loading than any of the other reasons for choice, including that of "opportunity to pursue a favorite interest." Women, in this case, do not appear to prize security against job loss and layoffs to the extent that men do, and appear to desire attractive physical surroundings, whereas men make a point of short working hours and frequent vacations.

Other factors have three or less variables in common when only loadings of .200 or more are taken into consideration. It may be stated, then, that for this study, the factoring and rotational methods used revealed essentially different factors underlying reasons for choice of teaching, with the exception noted above.

D.2 Men's and Women's Ranking Questionnaire

For convenience of comparing factors resulting from men's and women's ranking questionnaires, Table XXXV shows only variable values of .200 or higher. In this instance, several factors have three or more variables with values of .200 or more in common with each other, but in no case can factors be found with what might be termed parallel values.

Factor B in each matrix contains variables 3, 5, 7 and 9 with loadings sufficiently high to be included in this table. However, for the men, factor B also contains variables 11 and 12, and for the women, variables 6 and 8. These factors were termed, respectively, "Interest in Working in a Social Atmosphere" and "Interest in Public Welfare." For the men, factor B has highest values on variables 11 and 5, and for the women, variables 9 and 7. The two factors are quite different, although both show interest in service to society (variable 7).

The factors E are much alike, except that for the men, variable 3 has negative instead of positive value, and variable 12 has substantial value, whereas for the women variable 12 is not present.

The fact that the factors in each instance have five or more variables present with substantial values (except factor F for the men) results in considerable overlapping of variables between the factors. For this reason, it is hard to justify any conclusions of likeness between men's and women's factors. That is, although certain variables of factor A of the men's structure, for example, correspond to factor A of the women's structure, other variables of this factor might lead one to conclude that it was also much like women's factor C, etc.

It is, therefore, concluded that in this study little likeness was found between the factors of the men's and women's ranking questionnaire results.

D. 3 Comparison of Men's Paired-Comparison Test and Men's Ranking Questionnaire

For convenience of study Table XXXVI shows variable loadings of .200 or higher for the men's paired-comparison test and ranking questionnaire structure matrices. A certain likeness is seen between factor D of the paired-comparison matrix and factor B of the questionnaire matrix. Factor D, however, has present variables 2 and 10 which factor B does not, and factor B has present variable 12, not present on factor D. Both have variables 3, 5, 9, and 11 in common.

In each instance factor E contains variables 3 (although different in sign), 7, 9, and 12, but in the paired-comparison structure variables 1 and 11 are present and not in the questionnaire, and the questionnaire factor contains variable 2, not present in the paired-comparison factor. Variable 2 for the questionnaire matrix has the highest loading of any variable of that factor, whereas variable 3 has the highest loading in the paired-comparison factor. Since variable 3 is different in sign from test to questionnaire, the factors cannot be said to be similar in interpretation.

It may be concluded that, in this study, factors interpreted from the men's paired-comparison test results and the men's questionnaire results are dissimilar, since even in factors which are most alike, many differences are found.

4. Comparison of Women's Paired-Comparison Test and Ranking Questionnaire

For convenience in studying the women's paired-comparison factors and the ranking questionnaire factors, Table XXXVII is shown, using values of .200 and higher only.

Factor D of the paired-comparison test is somewhat like factor E of the ranking questionnaire in that both have values for variables 1, 2, 6, and 9 in Table XXXVII. However, factor D contains variables 5, 8, and 10 not present in E, and factor E contains variable 3 not present in D. These two factors have more variables common to each than any other two factors. The dissimilarities are such that it may be concluded that in this study, the factors resulting from the women's paired-comparison test are not similar to those of the ranking questionnaire.

5. Conclusions

There is little agreement between the factors found in the various instruments used in this study. Although some factors have four or more variables (of values .200 or higher) in common, no factors exist in any of the comparisons which have all the variables present in one also present in another. This is not surprising since it has long been known that the interests of men are different from those of women, although it has been debated as to whether this is purely cultural in causation or hereditary in part.

It was hypothesized in this study that different instruments, asking essentially the same questions, would produce different underlying factor structures and this was found here to be the case.

Further study is indicated, however, since it is believed that the compromise measures necessary in determining the various factor structures did not produce as clear pictures of the factors underlying the reasons for choice of teaching as is desirable. That is, in order to remove negative values in the structure matrices obtained by direct rotation, radial rotations were necessary, but these tended to reduce the numbers of variables of complexity one originally present.

A further question might be raised in regard to the nature of the ranking questionnaire and the paired-comparison test as psychological instruments. It is believed by the writer that since these are both closed systems, the nature of the responses is obscured to some extent. More study of this problem is therefore indicated.

E. Comparison of Results with Factors Found in the Strong Interest Blank

Darley,[31] factoring the Strong Vocational Interest Blank, forms for men and women, describes the following factors:

For men

I. Technical (chemist, engineer, scientific farmer, physician, physicist, architect, psychologist, artist, mathematician)

II. Verbal or linguistic (lawyer, editor, advertising agency man)

III. Business contact (life insurance salesman, real estate salesman)

IV. Welfare or uplift

Type A: (minister, teacher)

Type B: (personnel manager, city school superintendent, YMCA general secretary, physical director)

V. Business detail (accountant, office clerk, purchasing agent, specialty salesman)

VI. Certified Public Accountant (No other type)

31. Darley, op. cit.

TABLE XXXIII

FACTOR LOADINGS OF .200 AND OVER, WOMEN'S RANKING QUESTIONNAIRE

Factor	Variables	Loadings	Reasons
A	4	.580	Clean, attractive physical surroundings.
	1	.445	Relatively good financial reward
	3	.424	Security against job loss and layoffs
	11	.304	Variety of activities, little monotony
	6	.298	Opportunity for professional advancement
	2	.280	Ease of getting necessary education
B	9	.615	Ease of getting a job.
	7	.595	Opportunity to serve society
	8	.496	Prestige and respect of profession
	3	.429	Security against job loss and layoffs
	5	.303	Short working hours, frequent vacations
	6	.238	Opportunity for professional advancement
C	11	.648	Variety of activities, little monotony
	13	.497	Lack of physical strain
	3	.447	Security against job loss and layoffs
	10	.293	Opportunity to pursue a favorite interest
	9	.267	Ease of getting a job
	12	.267	Environment of interesting co-workers
	7	.252	Opportunity to serve society
D	3	.837	Security against job loss and layoffs
	4	.683	Clean, attractive physical surroundings
	11	.504	Variety of activities, little monotony
	12	.335	Environment of interesting co-workers
	10	.295	Opportunity to pursue a favorite interest
	7	.242	Opportunity to serve society
E	9	.457	Ease of getting a job
	1	.391	Relatively good financial reward
	6	.388	Opportunity for professional advancement
	3	.349	Security against job loss and layoffs
	2	.260	Ease of getting necessary education
F	5	.708	Short working hours, frequent vacations
	8	.563	Prestige and respect of profession
	2	.550	Ease of getting necessary education
	4	.400	Clean, attractive physical surroundings
	7	.353	Opportunity to serve society

TABLE XXXIV

MEN'S AND WOMEN'S PAIRED-COMPARISON TEST STRUCTURE MATRIX VALUES OF .200 AND HIGHER

	Men's Test Structure						Women's Test Structure					
Var.	A	B	C	D	E	F	A	B	C	D	E	F
1	.517	.304			.290	.588	.633				.461	
2	.617	.394		.300					.386	.493		
3	.563			.518	.610		.308	.612	.250			
4	.314	.531				.384			.218		.456	
5		.338	.637	.398						.556		
6		.467				.564				.655	.484	
7			.377		.399		.435					.237
8			.550				.357	.483		.580	.747	.353
9				.314	.545			.565	.306	.473		.322
10				.539				.334	.490	.301		.321
11				.283	.350				.668			
12					.512	.262					-.431	
13						.406		.407				.456

Variables	Reasons for Choice
1	Relatively good financial reward
2	Ease of getting necessary education
3	Security against job loss and layoffs
4	Clean, attractive physical surroundings
5	Short working hours, frequent vacations
6	Opportunity for professional advancement
7	Opportunity to serve society
8	Prestige and respect of profession
9	Ease of getting a job
10	Opportunity to pursue favorite interest
11	Variety of activities, little monotony
12	Environment of interesting co-workers
13	Lack of physical strain

TABLE XXXV

MEN'S AND WOMEN'S RANKING QUESTIONNAIRE STRUCTURE MATRIX VALUES OF .200 AND HIGHER

	Men's Structure Values						Women's Structure Values					
Var.	A	B	C	D	E	F	A	B	C	D	E	F
1			.575		.507		.445				.391	
2	.362				.671		.280				.260	.550
3		.412	.548	.209	-.389	.402	.424	.429	.447	.837	.340	
4	.390		.423	.242			.580			.683		.400
5	.498	.509		.671		-.629		.303				.708
6						.440	.298	.238			.388	
7		.322	.335	.399	.373			.595	.252	.242		.353
8			.344	.528				.496				.563
9	.225	.436			.515			.615	.287		.457	
10	.520								.293	.295		
11	.308	.549					.304		.648	.504		
12	.313	.328	.220		.597				.267	.335		
13			.487						.493			

Variables	Reasons for Choice
1	Relatively good financial reward
2	Ease of getting necessary education
3	Security against job loss and layoffs
4	Clean, attractive physical surroundings
5	Short working hours, frequent vacations
6	Opportunity for professional advancement
7	Opportunity to serve society
8	Prestige and respect of profession
9	Ease of getting a job
10	Opportunity to pursue favorite interest
11	Variety of activities, little monotony
12	Environment of interesting co-workers
13	Lack of physical strain

In the present study a factor of "Interest in Public Welfare" was found in the men's ranking questionnaire, which corresponds to Darley's Welfare or Uplift Types. In the questionnaire a factor of "White Collar Interests" was found which seems much like Darley's "Business Detail" factor. Other factors found in this study have little resemblance to any found by Darley.

In factoring the Strong Blank for women, Darley found the following factors:

I. Technical (dentist, physician, science or mathematics teacher)

II. Verbal or linguistic (author, artist, librarian)

III. Business contact (life insurance saleswomen)

IV. Welfare or uplift (social science teacher, lawyer, YWCA secretary, social worker)

V. Non-professional (general office worker, nurse, stenographer, secretary, housewife)

Factors of "Interest in Public Welfare" were found in both the women's paired-comparison and ranking questionnaire. Other factors do not seem at all similar to those found by Darley.

1. Conclusions

It was expected that "Technical" factors would be found in this study, corresponding to those found in the Strong Blank. This was not the case. It was found, however, that in both the paired-comparison test and ranking questionnaire for women, and in the ranking questionnaire for men, factors much like Darley's "Welfare" or "Uplift" could be identified. Some substance is thus given the belief that an idealistic, "service to society" type of interest can be found underlying reasons for choice of teaching as a career.

SECTION IV

RELATION OF REASONS FOR CHOICE OF TEACHING TO TEACHER SUCCESS

A. How the Data Were Collected

1. Visitation of Beginning Teachers

SIXTEEN MEN and eighteen women of the original groups of subjects were available for visitation as beginning teachers in the school year 1950-51. The subjects were located in various areas of Wisconsin, and in various sizes of school systems, selections being made purely on a basis of availability for study.

During the fall and early winter months of that year, the University of Wisconsin School of Education carried on a program of visiting all 1950 Education graduates then engaged in beginning teaching for purposes of discovering problems of beginning teachers, helping them adjust to their school situations, gaining suggestions for improvement of university courses and training methods, and measuring the success of beginning teachers.

Each beginning teacher was visited by two qualified observers in each of two teaching situations. Efficiency ratings, using the Wisconsin Adaptation of the M-Blank, were made by the observers, a copy for the use of the superintendent being left for later use and return by mail.

The observers jointly interviewed each superintendent at the time of visitation to secure an acceptability rating of each teacher. The form of this interview has already been described in Section I.

2. Statistical Procedures Employed

Efficiency scores were the averages of the final ratings on the M-Blank made by the two observers and the superintendent. The superintendents acceptability ratings were in terms of extremely acceptable, above average, average, poor, or failing, a single score only being used.

Product-moment correlations were made among the various ratings and reasons for the choice of teaching as given by the various tests and questionnaires. Beta coefficients were calculated using the Doolittle method,[32] and multiple correlation coefficients calculated.[33]

B. Analysis of Data

1. The Paired-Comparison Test

Means and standard deviations for the scores of the reasons for choice of teaching are shown in Table XXXVIII. The items, in order of rank from most frequently to least frequently chosen, are shown in Table XXXIX. It is seen that men and women state that among the most important reasons for the choice of teaching as a profession are interest in subject matter ("opportunity to pursue a favorite interest") and belief in the opportunity to serve society. Men place interest in subject matter first and service to society second, whereas women reverse this order. Interest in the variety of activities and in interesting

32. C. C. Peters and W. R. Van Voorhis, Statistical Procedures and Their Mathematical Bases (New York: McGraw Hill Book Co., 1940), p. 240.

33. Ibid., p. 240.

TABLE XXXVI

MEN'S PAIRED-COMPARISON TEST STRUCTURE MATRIX AND RANKING QUESTIONNAIRE MATRIX VALUES OF .200 OR HIGHER

	Paired-Comparison Structure						Ranking Questionnaire					
Var.	A	B	C	D	E	F	A	B	C	D	E	F
1	.517	.304			.290	.588			.575		.507	
2	.617	.394		.300			.362				.671	
3	.563			.518	.610			.412	.548	.209	-.389	.402
4	.314	.531				.384	.390		.423	.242		
5		.338	.637	.398			.408	.509		.671		.629
6		.467				.564						
7			.377		.399			.322	.335	.399	.373	
8			.550						.344	.528		
9				.314	.545		.225	.436			.515	
10				.539			.520					
11				.283	.350		.308	.549				
12					.512	.262	.313	.220			.597	
13						.406		.487				

Variables	Reason for Choice
1	Relatively good financial reward
2	Ease of getting necessary education
3	Security against job loss and layoffs
4	Clean, attractive physical surroundings
5	Short working hours, frequent vacations
6	Opportunity for professional advancement
7	Opportunity to serve society
8	Prestige and respect of the profession
9	Ease of getting a job
10	Opportunity to pursue a favorite interest
11	Variety of activities, little monotony
12	Environment of interesting co-workers
13	Lack of physical strain

TABLE XXXVII

WOMEN'S PAIRED-COMPARISON TEST AND RANKING QUESTIONNAIRE STRUCTURE, USING VALUES OF .200 AND HIGHER

	Women's Paired-Comparison						Women's Ranking					
Var.	A	B	C	D	E	F	A	B	C	D	E	F
1	.633			.461			.445				.391	
2			.386	.493			.280				.260	.550
3	.308	.612	.250				.424	.429	.447	.837	.349	
4			.218		.456		.580					.400
5				.556				.303				.708
6				.655	.484		.298	.238			.388	
7	.435					.237		.595	.252	.242		.353
8	.357	.483		.580	.747	.353		.496				.563
9		.565	.306	.473		.322		.615	.267		.457	
10		.334	.490	.301		.321			.293	.295		
11			.668				.304		.648	.504		
12					-.431				.267	.335		
13		.407				.456			.493			

Variable	Reasons for Choice
1	Relatively good financial reward
2	Ease of getting necessary education
3	Security against job loss and layoffs
4	Clean, attractive physical surroundings
5	Short working hours, frequent vacations
6	Opportunity for professional advancement
7	Opportunity to serve society
8	Prestige and respect of profession
9	Ease of getting a job
10	Opportunity to pursue a favorite interest
11	Variety of activities, little monotony
12	Environment of interesting co-workers
13	Lack of physical strain

co-workers are in each case among the next three orders of rank. Ease of getting necessary education, ease of getting a job, and lack of physical strain, rank 11th, 12th, and 13th in the case of both men and women.

Since five reasons received the same rank, and since two reasons ranked first and second (although interchanged between men and women), it is concluded that men and women do not differ greatly in regard to the relative rank of the reasons for choice of teaching employed in this instrument.

Correlations of reasons for choice responses with acceptability ratings are shown in Table XLII. In the case of men, reasons 3, 4, 6, 7, and 9 have the highest correlations. Beta coefficients were calculated and multiple correlation coefficient between acceptability and these reasons was found to be .64.

A low positive relationship exists for the men between acceptability and desire for security against job loss and layoffs, desire for clean and attractive physical surroundings, and desire for ease of getting a position. This corresponds roughly to the variables represented in the "security" factor (A) mentioned in Section III. Negative relationship between acceptability and the desires for professional advancement and opportunity to serve society exists, leading to the speculation as to whether superintendents deem more acceptable those men who are "gladdest to have a job", or whether such men really work harder and better than those who are more ambitious or idealistic.

In the results from the women's paired-comparison test, only two reasons for choice, numbers 1 and 9, have correlations of .300 or more with acceptability. The multiple R, using these variables, is .436. This low coefficient indicates that in this study little relationship was shown to exist between success or women teachers and responses to the paired-comparison test.

2. The Ranking Questionnaire

The means and standard deviations for the scores of the ranking questionnaire are shown in Table XL, and the rank order of reasons for choice in Table XLI. Since a high mean in this instrument corresponds to a low rank, the means and standard deviations must be compared inversely with those of the paired-comparison test. It is seen that, as in the paired-comparison test, reasons for choice of most important are numbers 10 and 7, and again the men rank reason 10 first and reason 7 second, whereas the women reverse this order. Again, reason 3, "lack of physical strain", is ranked lowest for both men and women. For the men, reasons 9 and 2 are next lowest, but for the women reason 9 and 6 are next lowest. Only two reasons, numbers 5 and 13, have the same rank in the men's and women's questionnaires, although reasons 10 and 7 are simply reversed. Thus the ranking is not as closely in correspondence between men and women in with the ranking questionnaire as in with the paired-comparison test.

for the men, correlations between acceptability and reasons 4 and 10 are highest. Reason 4, "clean, attractive physical surroundings", has a positive correlation, whereas reason 10, "ease of getting necessary education", has a negative correlation with acceptability. The multiple R, using these two reasons for choice, is .76.

For the women, reasons 4, 5, and 12 have the highest correlations. Using these reasons, multiple R is .78. Correlations are shown in Table XLIII.

In comparing the results of the paired-comparison test with those of the ranking questionnaire, reason 10, "opportunity to pursue a favorite interest", is first in order of rank in each instrument. Reason 7, "opportunity to serve society", is second. Reason 13, "lack of physical strain", is in last place, and reasons 2 and 9, "ease of getting necessary education" and "ease of getting a job" are in the next to the last places. In each instrument reason 11 is in third place and reason 1 in tenth place; reason 5 is in ninth place.

For the women, reasons 7 and 10 are in first and second orders of rank in both instruments, and reasons 9 and 13 in the last two places. Reasons 2 and 6 are in tenth and eleventh places, though reversed in the two instruments.

In the instruments used in this study, then, rank orders of raw scores are essentially the same, and there may be concluded that few, if any, deliberate misleading answers existed in the ranking questionnaire. It has not been demonstrated that any particular reasons for the choice of teaching are consistently related to teaching success in the case of these subjects.

Correlations of M-Blank ratings with acceptability ratings resulted in coefficients of .90 for the men and .82 for the women. This seems to be an indication that the two instruments are measuring essentially the same qualities of the teachers. Differences between the means of acceptability and efficiency ratings are .25 for the men and .40 for the women. This indicates that ratings on acceptability scales are somewhat more lenient than on the M-Blank scales. This may merely mean that superintendents and observers were judging efficiency in terms of the ideal teacher, rather than in terms of beginning teachers, whereas acceptability would be common to both beginning and ideal or experienced teachers.

Since it was concluded that essentially the same qualities of the teachers were being measured by both the M-Blank and acceptability ratings, test items were not correlated with the M-Blank ratings. It is of interest to see that a

TABLE XXXVIII

RAW SCORE MEANS AND STANDARD DEVIATIONS, PAIRED-COMPARISON TEST

Item	Men (N = 63) Mean	S. D.	Women (N = 37) Mean	S. D.	Reason for Choice
1	4.79	3.46	6.40	2.95	Relatively good financial reward
2	3.06	2.40	3.54	2.46	Ease of getting necessary education
3	7.77	3.22	7.32	2.83	Security against job loss and layoffs
4	6.52	2.46	6.43	2.05	Clean, attractive physical surroundings
5	5.14	3.32	5.00	3.32	Short working hours, frequent vacations
6	6.38	3.00	4.46	3.21	Opportunity for professional advancement
7	7.90	3.90	8.59	3.33	Opportunity to serve society
8	6.96	2.74	7.41	2.37	Prestige and respect of profession
9	2.79	2.98	3.38	3.30	Ease of getting a job
10	9.19	2.57	8.00	2.74	Opportunity to pursue a favorite interest
11	7.80	2.44	7.89	2.90	Variety of activities, little monotony
12	7.00	2.73	7.92	3.04	Environment of interesting co-workers
13	2.66	2.32	1.64	1.40	Lack of physical strain

TABLE XXXIX

ITEM IN ORDER OF MOST FREQUENT CHOICE, PAIRED-COMPARISON TEST

Men (N = 63)			Women (N = 37)		
Rank	Item	Reason for Choice	Rank	Item	Reason for Choice
1	10	Favorite interest	1	7	Serve Society
2	7	Serve Society	2	10	Favorite interest
3	11	Variety activities	3	12	Interesting co-workers
4	3	Security/job loss	4	11	Variety activities
5	12	Interesting co-workers	5	8	Prestige/respect
6	8	Prestige/respect	6	3	Security/job loss
7	4	Clean, attractive surroundings	7	4	Clean, attractive surroundings
8	6	Professional advancement	8	1	Financial reward
9	5	Short hours, vacation	9	5	Short hours, vacation
10	1	Financial reward	10	6	Professional advancement
11	2	Ease of getting education	11	2	Ease of getting education
12	9	Ease of getting job	12	9	Ease of getting job
13	13	Lack of physical strain	13	13	Lack of physical strain

TABLE XL

RAW SCORE MEANS AND STANDARD DEVIATIONS, RANKING QUESTIONNAIRE

Item	Men (N = 63) Mean	S. D.	Women (N = 27) Mean	S. D.	Reason for Choice
1	8.22	3.52	6.58	3.59	Relatively good financial reward
2	9.44	2.77	7.89	3.38	Ease of getting necessary education
3	5.89	3.76	5.76	3.47	Security against job loss and layoffs
4	5.83	3.09	6.56	3.52	Clean, attractive physical surroundings
5	7.13	3.27	7.14	3.61	Short working hours, frequent vacations
6	6.56	3.46	8.49	3.21	Opportunity for professional advancement
7	5.10	3.74	4.95	4.24	Opportunity to serve society
8	5.84	2.88	6.24	3.16	Prestige and respect of profession
9	9.40	3.28	8.74	3.45	Ease of getting a position
10	4.38	3.70	5.05	3.63	Opportunity to pursue a favorite interest
11	5.70	3.23	6.86	3.36	Variety of activities, little monotony
12	6.63	3.09	6.73	3.22	Environment of interesting co-workers
13	10.68	2.27	10.19	2.62	Lack of physical strain

TABLE XLI

ITEMS IN ORDER OF RANK, HIGHEST TO LOWEST, RANKING QUESTIONNAIRE RAW SCORE DATA

Men (N = 63)			Women (N = 37)		
Rank	Item	Reason for Choice	Rank	Item	Reason for Choice
1	10	Favorite interest	1	7	Serve society
2	7	Serve society	2	10	Favorite interest
3	11	Variety activities	3	3	Security/job loss
4	4	Clean, attractive surroundings	4	8	Prestige/respect
5	8	Prestige/respect	5.5	1	Financial reward
6	3	Security/job loss	5.5	4	Clean, attractive surroundings
7	6	Professional advancement	7	12	Interesting co-workers
8	12	Interesting co-workers	8	11	Variety activities
9	5	Short hours, vacation	9	5	Short hours, vacation
10	1	Financial reward	10	2	Ease of getting education
11	9	Ease of getting job	11	6	Professional advancement
12	2	Ease of getting education	12	9	Ease of getting job
13	13	Lack of physical strain	13	13	Lack of physical strain

single judgment of acceptability, made by a superintendent, is highly correlated with a composite judgment of efficiency made by two university observers and the superintendent. Since superintendents' ratings usually influence the employment of the teachers, it is reassuring to find that in this case the judgments of the superintendents alone corresponded highly to the judgments of the superintendents combined with university observers' judgments.

3. Conclusions

It can be concluded that there is a consistent pattern followed by the subjects with both the paired-comparison test and the ranking questionnaire. In each case, the highest two items in order of rank, and the lowest four items were consistently chosen. The men and women differ in that women place service to society first and interest in subject matter second, whereas men reverse this order, but the lowest items correspond closely when men and women are compared.

Multiple correlation coefficients were high enough to justify further study of the relationship between reasons for choice of teaching and teacher success. Little consistency was found, however, among the variables contributing to the multiple correlation coefficients calculated.

C. The Strong Vocational Interest Blanks

Comparison of interest scores on the Strong Vocational Interest Blank with acceptability scores of subjects teaching in areas mentioned in the Strong blank shows that for the men, interest scores are high whether the subjects are highly acceptable or not. Distributions are shown in Table XLIV.

In the form for men, the Strong blank includes the categories of Mathematics-Physical Science Teacher, Social Science Teacher, Physical Director (YMCA), Musician, and Artist. The latter two categories do not refer to teaching of music and art, but it may be assumed that the categories are large enough to include the teaching of these subjects, since teaching is often a large source of income to persons musically and artistically inclined. In respect to the definition of its categories, the Strong blank leaves much to be desired, but since the instrument does not pretend to more than an indication of direction of interest, this is not a serious indictment. The question was raised in this study as to whether the Strong Vocational Interest Blank, a standardized instrument, showed the same relationship to teacher success as did the instruments devised by the writer.

Making the assumption that an "A" on the Strong blank could represent a value of 6 on a six-point scale, B+ a 5, etc., the correlation between the Strong test and acceptability for men was found to be zero. There was found no relationship between interest scores as used with methods indicated above, and acceptability.

In the case of the Strong Vocational Interest Blank for women, more teaching categories are listed, than is the case with the men's blank. Correlation between values for the women's blank (calculated as for the men), and acceptability was found to be .22.

The conclusion may be drawn that in the case of these subjects, interest as revealed by the Strong blank has little relationship to teacher success.

Another use of the Strong test was made, in that it was desired to examine interests other than those in teaching, as revealed by this test, with a view to discovering how many of these other interests exceeded those of a teaching nature. For the men, it was found that a mean value of 3.71 for interests other than of a teaching nature, was exceeded by interest in teaching which had a mean value of 5.18.

From the above-mentioned data, it is apparent that interest in teaching as measured by the Strong Vocational Interest Blank is not paramount over other interests, even though the subjects are actually engaged in teaching. It is not a purpose of this study to examine this information further, but it is felt that an indication of need for further work in this area has been made.

SECTION V

COMPARISON QUESTIONNAIRE AND AUTOBIOGRAPHICAL DATA

A. Comparison of the Education Profession with Certain Other Professions and Occupations

IN AN EFFORT to gain some idea of the status of the Education profession compared to various other occupations, a questionnaire called "Beliefs of Advantages of Various Occupations" was devised (see Appendices C1 and C2). The various occupations listed for comparison were the result of judgments made from examination of the literature, such as the study of Fox and Richey[34] and from a perusal of autobiographies available.

Mean ranks and standard distributions of the ranks are shown in Tables XLVI and XLVII. As is indicated by the standard distributions there is considerable overlap between the ranks of the various occupations, especially those occupations near the center of the range. This might be ex-

34. Fox and Richey, op. cit.

pected, since the various persons would have a variety of experiences and beliefs about any occupation.

Arranging the mean rank values into a rank order, as in Tables XLVIII and XLIX, it is seen that Education is relatively well regarded by the subjects.

Examining the beliefs of the men's group, it is seen that the financial reward offered by education is considered to be very small when compared to the other occupations listed. The required education and position are of medium difficulty to obtain, and professional advancement possibilities are considered to be near the middle of the range. However, education seems to offer real opportunity when considered in the light of security against job loss and layoffs, service to society, prestige and respect, and lack of physical strain, and is most desirable of all occupations listed in terms of attractive physical surroundings, short working hours and frequent vacations, opportunity to pursue a favorite subject matter interest, variety of activities, lack of monotony, and interesting co-workers. Apparently the men believe that teaching is, if not particularly lucrative, an interesting and secure occupation.

The profession of medicine ranks high in this list. Medicine is ranked first in financial reward, security against job loss and layoffs, service to society, prestige and respect, and ranks third in opportunity for professional advancement. However, medicine is ranked last in ease of getting the necessary education, and thirteenth in regard to short working hours and frequent vacations and interesting co-workers. Apparently medicine is a worthwhile and lucrative profession, but arduous, both in terms of education and practice.

The ministry and law rank comparatively high in regard to these reasons for choice of occupation. Among the occupations of low rank are farming (ranking last in terms of attractive physical surroundings, short working hours, professional advancement, prestige and respect, interesting co-workers, and lack of physical strain, and thirteenth in being a favorite interest), and accounting (last in terms of service to society, favorite interest, and variety of activities). Social work pays poorly and is not attractive, but carries a connotation of respect, service to society, and variety.

In the case of the beliefs signified by the women's group, Education is again seen to be a highly desirable occupation—the profession holds first rank in regard to clean and attractive physical surroundings, short working hours and frequent vacations, opportunity to pursue a favorite interest, and variety of activities with little monotony. It ranks second in regard to presence of interesting co-workers, service to society, and prestige and respect. Again, financial reward is considered to rank near the bottom of the range. Opportunity for professional advancement, ease of getting the necessary education, and ease of getting a position are, as with the men, considered to be of medium difficulty in comparison with the other occupations listed.

Medicine, as is the case with the men's group, is felt by the women to offer excellent financial reward, professional advancement, security, service to society, prestige and respect. It is considered very difficult to obtain the necessary education, and requires long working hours, few vacations, and considerable physical strain, evidently due to the long working hours.

The secretarial occupation ranks first in ease of getting the necessary education, and in lack of physical strain. It ranks second in regard to short working hours, and ease of getting a position, and third in regard to attractive surroundings. On the other hand, the financial reward is considered low, as are service to society, prestige and respect, and opportunity for professional advancement. The work is considered rather monotonous and the co-workers not particularly interesting.

Other occupations are believed to have some advantages and disadvantages resulting in a total position more nearly in the center of the range than those occupations mentioned above.

Whether the subjects were reacting to stereotypes of the various occupations, or whether they were reacting to actual experiences with some of these occupations, is not known. It is probable that the subjects had had more experience with the education profession than any other, since sixteen years (or more) of their lives had been spent in school, affording ample opportunity to observe. It must also be a matter of speculation as to the type of position the subjects had in mind when confronted with such terms as "sales", "entertainment", or "laboratory technician". That is, there is a large range of occupations under the term "sales"—dime store clerks to specialized sales engineers—and the particular segment of the occupation in the mind of the subjects when reacting to these terms might be expected to color their response. It may be reasoned that considering the relatively large number of subjects reacting to this questionnaire, most phases of any category would be taken into consideration by at least some of the subjects.

Since Education holds first rank in six of the thirteen reasons for choice by men and seven of the thirteen reasons for choice by women, it may be concluded that Education is relatively highly regarded by these subjects as a profession. The reasons for choice in which Education had the most appeal were: clean, attractive physical surroundings; short working hours, frequent vacations; opportunity to serve society; prestige and respect of the profession; opportunity to pursue

TABLE XLII

CORRELATIONS OF SCORES ON PAIRED-COMPARISON TEST WITH ACCEPTABILITY

	Reason for Choice	r (Men) N = 16	r (Women) N = 18
1.	Relatively good financial reward	-.221	.362
2.	Ease of getting necessary education	.028	.139
3.	Security against job loss	.416	.000
4.	Clean, attractive physical surroundings	.317	-.117
5.	Short working hours, frequent vacations	.112	.123
6.	Opportunity for professional advancement	-.447	.251
7.	Opportunity to serve society	-.333	-.121
8.	Prestige and respect of profession	-.090	-.042
9.	Ease of getting job	.337	-.386
10.	Opportunity to pursue favorite interest	-.258	-.092
11.	Variety of activities, little monotony	.072	-.281
12.	Environment of interesting co-workers	.000	.270
13.	Lack of physical strain	.019	-.098

TABLE XLIII

CORRELATIONS OF SCORES ON RANKING QUESTIONNAIRE WITH ACCEPTABILITY

	Reason for Choice	r (Men) N = 16	r (Women) N = 18
1.	Relatively good financial reward	-.147	.107
2.	Ease of getting necessary education	.071	-.029
3.	Security against job loss	.185	.281
4.	Clean, attractive physical surroundings	.619	.448
5.	Short working hours, frequent vacations	-.228	-.451
6.	Opportunity for professional advancement	-.208	-.017
7.	Opportunity to serve society	-.153	-.146
8.	Prestige and respect of profession	-.188	.126
9.	Ease of getting job	.185	-.167
10.	Opportunity to pursue favorite interest	-.450	.000
11.	Variety of activities, little monotony	-.123	-.225
12.	Environment of interesting co-workers	.163	.375
13.	Lack of physical strain	.000	-.284

TABLE XLIV

DISTRIBUTION OF RATINGS IN AREAS OF STRONG INTEREST BLANK AND ACCEPTABILITY RATINGS FOR MEN SUBJECTS

Strong Rating in Subj. Area Interest	Acceptability Rating (N = 16)				
	Superior	Above Av.	Average	Below Av.	Poor
A	7	6		1	
B+					
B					
B-					
C+					
C					
No Data	1		1		

TABLE XLV

DISTRIBUTION OF RATINGS IN AREAS OF STRONG INTEREST BLANK AND ACCEPTABILITY RATINGS, FOR WOMEN SUBJECTS

Strong Rating in Subj. Area Interest	Acceptability Rating (N = 18)				
	Superior	Above Av.	Average	Below Av.	Poor
A	1	5			
B+	1	1			
B		2			
B-			1		1
C+		1			
C	1	2			1
No Data			1		

a favorite interest; variety of activities, little monotony; interesting co-workers; and to a lesser degree, security against job loss and layoffs and lack of physical strain. The only reason for choice holding a very low rank was that of financial reward.

The conclusion may be reached that in terms of responses of these subjects, the profession of Education has been largely felt to be interesting and worthwhile in service to society and respectability. Evidently this attitude out-weighs the unhappiness over the pay status of teachers insofar as these subjects are concerned, since they were, at the time of testing, preparing to teach.

B. Certain Influences in the Choice of Teaching as a Career

The question of who (or what agency) influenced the subjects in their choice of teaching as a career was approached in the "Influences" questionnaire. Tabulation of results is shown in Table L. Since each subject could check several influences, the items will vary from the total number of men (63) and women (37) responding.

Examination of the above table indicates that in the case of these subjects, teachers had great influence in helping them decide to enter the profession. Implications for recruiting may result from a further study of this factor in choice of occupation. Counseling had less effect, but whether this is due to lack of adequate counseling, or to lack of any counseling at all, is not known. It is also seen that the publicity of the profession in recent years was not of a character to influence these subjects in their choice of profession.

Evidently these subjects had thought seriously of their careers, at least to the extent of studying their interests and abilities in connection with teaching. Just how extensive and how valid these studies were would be difficult to determine, but the subjects apparently agree that they are fitted for teaching and believe that they would like teaching as a profession.

The subjects were also asked questions concerning their expected stay in the profession. Data is tabulated in Table LI, the same considerations concerning the number of responses applying as in Table LI.

Perhaps the significant note in regard to the answers of the questions in respect to length of teaching service is to be found in the fact that only sixteen men and eighteen women were to be found in teaching careers in Wisconsin during the school year 1950-51. Whether this was because of inability to get a position, because of military service, or because of other considerations is not known and indicates a need for further study. If sincere, at the time of questioning most men and all of the women expected to make use of their professional education.

That most of the subjects had had some experiences of a teaching nature which might help them to decide for or against a teaching career is attested by Table LII.

The question concerning other experiences of a teaching nature was largely answered by the men in terms of military teaching, coaching of "sandlot" ball teams, swimming instruction, and Scouting. The women answered largely in terms of care of small children and tutoring.

C. Autobiographies

Autobiographies of sixteen women and twenty-six men subjects were available for study. These documents, written in the school year 1948-49 as a relatively unstructured assignment revealed much concerning the manner in which the subjects were led to the teaching profession. Sample entries are portrayed below for illustration.

1. "Our high school program was designed as a college preparatory course. By the Junior year (of H. S.) we were beginning to feel the shortage of teachers and our high school had to hire teachers unfit and untrained for high school teaching. I was unable to take chemistry (not offered) and I could not take a course of physics either, both of which I'd need if I was to follow the home economics field. I took several secretary courses and was hired as part time secretary to the superintendent. I did not care for this type of work—it did not offer enough variety for me... I became quite close to my teachers through this work and so I had the opportunity to know more what teaching had to offer. All my teachers would tell me to give up teaching for a career unless I was doing it for the "love of it" —'it's a poor paying position and in a small town its always a headache'. I could always see their point of view but it did not discourage me... At this time I did not know what I wanted to teach... I had two main interests... My second year I had another young home economics teacher... She was a very excellent teacher and I became more and more interested in home economics... My husband is a senior... and will enter graduate school next fall. He studies hard and encourages me and that is the main reason I hope to teach because I want him to receive all the education possible... I always wanted to be a school teacher like my mother. She is the most dominant influence. I have always tried to imitate her since a small child."

Here are shown several ways in which persons are interested in teaching—contact with good teachers, contact informally with teachers, dis-

TABLE XLVI

MEAN RANK OF FOURTEEN OCCUPATIONS IN REGARD TO REASONS FOR CHOICE AS REPORTED BY THE MEN'S GROUP
(N = 63)

		Financial Reward	Ease of Education	Security/Job Loss	Attractive Surroundings	Working Hours Vacations	Professional Advancement	Serve Society	Prestige Respect	Ease to get Job	Favorite Interest	Variety Activities	Interesting Co-workers	Lack of Physical Strain
Farming	Mean	9.13	2.98	4.78	11.38	12.40	11.63	6.85	12.47	4.71	9.67	6.93	12.01	12.85
	S.D.	3.14	2.93	3.14	3.91	2.80	3.54	2.21	2.56	3.86	4.24	4.58	2.95	2.59
Medicine	Mean	2.03	12.69	2.00	5.64	10.88	4.49	2.32	1.89	6.11	7.18	6.75	9.34	6.61
	S.D.	1.35	3.20	1.47	4.74	3.93	3.00	1.62	1.63	4.83	4.16	3.56	3.93	3.82
Law	Mean	3.02	11.86	4.58	4.25	6.54	4.19	6.20	2.89	8.32	6.39	7.49	6.36	5.95
	S.D.	2.54	2.59	3.33	2.53	3.11	2.48	2.62	1.65	3.03	2.87	3.16	3.85	2.88
Ministry	Mean	10.84	9.77	3.29	4.34	6.87	10.72	3.90	4.02	4.64	7.36	6.13	7.77	4.66
	S.D.	2.38	2.99	2.36	3.45	4.69	2.77	3.14	2.98	3.38	4.06	4.02	4.30	3.26
Education	Mean	9.00	7.18	4.56	3.57	4.59	6.90	2.44	4.62	7.50	3.46	4.06	2.92	6.53
	S.D.	1.98	2.85	3.80	2.31	3.78	3.10	1.26	2.27	3.22	2.94	3.08	2.03	3.79
Engineering	Mean	5.22	10.75	8.16	9.45	8.54	5.77	8.20	6.74	9.53	8.59	9.03	8.98	10.16
	S.D.	2.71	1.99	3.76	2.21	2.60	3.40	2.10	2.40	3.09	3.15	3.16	2.55	3.51
Laboratory Res.	Mean	8.90	10.15	7.83	8.16	8.92	7.55	6.41	7.53	9.20	6.83	9.75	8.73	7.06
	S.D.	2.48	2.95	3.03	3.38	2.70	3.15	2.96	2.97	3.42	3.91	4.08	3.44	3.77
Business Manage.	Mean	3.85	7.01	8.03	4.96	5.44	3.98	9.69	6.42	9.63	6.77	7.56	6.90	5.78
	S.D.	1.67	1.93	2.57	2.66	2.93	3.02	3.28	2.88	3.42	3.29	3.36	2.25	3.42
Sales	Mean	7.11	6.08	11.18	8.15	6.25	6.25	10.00	10.75	4.85	8.60	8.16	6.62	7.16
	S.D.	3.35	3.62	2.48	3.56	3.21	3.80	3.35	2.42	3.64	3.04	2.28	3.19	3.42
Entertainment	Mean	6.53	4.59	12.48	9.77	6.10	8.69	7.28	8.53	9.34	5.87	6.29	4.75	10.49
	S.D.	3.22	3.90	2.68	3.97	4.21	4.00	4.31	3.87	4.15	4.51	4.08	4.14	3.20
Social Work	Mean	11.71	5.90	7.46	10.74	9.43	9.84	3.73	7.89	6.31	6.70	4.42	5.45	7.72
	S.D.	1.30	3.44	2.11	2.91	3.34	1.32	2.80	3.09	3.13	3.50	2.73	3.66	3.77
Journalism	Mean	8.83	8.85	8.31	8.15	7.18	7.41	7.88	8.31	8.53	7.63	7.10	6.00	6.98
	S.D.	2.97	2.80	3.34	3.16	2.90	2.86	2.54	2.45	3.32	3.83	2.42	2.29	3.23
Advertising	Mean	5.86	6.11	10.57	7.06	5.42	6.68	11.24	10.47	7.64	8.08	8.15	8.13	5.37
	S.D.	3.13	2.79	2.47	2.89	3.17	2.92	2.30	2.42	3.16	2.65	3.25	3.01	2.88
Accounting	Mean	7.84	7.27	9.15	6.73	6.44	8.52	11.88	10.02	6.95	11.96	11.40	5.92	9.13
	S.D.	3.59	2.57	3.26	2.49	1.74	2.73	1.53	1.91	3.01	2.61	2.00	3.81	3.60

TABLE XLVII

RANK ORDER OF FOURTEEN PROFESSIONS IN REGARD TO REASONS FOR CHOICE OF OCCUPATION AS REPORTED BY THE MEN'S GROUP
(N = 65)

	Financial Reward	Ease of Education	Security/Job Loss	Attractive Surroundings	Working Hours Vacations	Professional Advancement	Serve Society	Prestige Respect	Ease to get Job	Favorite Interest	Variety Activities	Interesting Co-Workers	Lack of Physical Strain
Medicine	1	14	1	6	13	3	1	1	4	7	5	13	6
Law	2	13	4	2	7	2	5	2	9	3	8	6	4
Journalism	9	6	10	9	9	8	9	9	10	9	7	5	7
Business Management	3	7	8	4	2	1	11	5	13	5	9	8	3
Sales	7	5	13	9	5	5	12	13	3	12	10.5	7	9
Engineering	4	12	9	11	10	4	10	6	14	11	12	12	12
Ministry	13	10	2	3	8	13	4	3	1	8	3	9	1
Social Work	14	3	6	13	12	12	3	8	5	4	2	3	10
Advertising	5	5	12	7	3	6	13	11	8	10	10.5	10	2
Labatory Research	10	11	7	9	11	9	6	7	11	6	13	11	8
Accounting	8	9	11	6	6	10	14	12	6	14	14	4	11
Farming	12	1	5	14	14	14	7	14	2	13	6	14	14
Entertainment	6	2	14	12	4	11	8	10	12	2	4	2	13
Education	11	8	3	1	1	7	2	4	7	1	1	1	5

gust with clerical work, encouragement of parents, encouragement by husband, financial help for husband, and enjoyment of the subject. This girl received a teaching position, and was rated average as to teaching efficiency and average as to acceptability.

2. "When I reached high school I had decided that I was going into art as a career and although many times I lacked the confidence to go on with my decision, these teachers assured me that I had just as much of a chance as the rest of them. I hadn't decided to be a teacher, as yet, but by the time I was a senior I was almost positive that this was what I wanted to do... Ever since I can remember I have been interested in art and sports. I have always been encouraged in both fields, especially art, and have been able to distinguish myself in both. Everything of importance to me and every impression that has influenced me out of my 21 years has come from my connection and interest in art."

This girl is now teaching and is rated average in efficiency and average in acceptability. Here is seen the interest in the subject matter, and the part recognition and success plays in leading one to follow a certain career.

3. "One high school teacher influenced me to be an interpreter, for translation of foreign languages came quite easily to me. I planned on majoring in this field when I came to college, but to my dismay I really didn't care for the field... Looking at the more cultural aspect, I enjoy reading immensely and the subjects that hold my interest are mostly classical and humanity subjects, while math, science, and economics completely bore me, mainly because I can't understand them, and don't bother to sit down and work at them... In my mind advancement and enjoyment of a position is primary, with money being secondary. I feel that it is very important to know people, but choice people only, but you can learn and derive something that you may in time add to your own personality."

This girl is not teaching this year and no record was found of her location. Here is seen the influence of "advancement and enjoyment of a position", and the liking for "choice people only."

4. "Right from the start I received satisfaction in doing well in my school work... I found great interest in art class and geography. Having a gifted and artistic mother must have played an important role in my life for art... Geography proved extremely interesting to me because there was a tie-up there with my art work. I would sit and draw maps by the hour. Perhaps the greatest single factor in my choosing the physical education field as my major at the University was a direct outgrowth of my days in junior high school. I was on the school basketball team and it seems that the coach was having more work than he could possibly handle by himself. So he requested two gym assistants for each of his classes. I was accepted... I relished the responsibility...shared with the coach the burden of teaching the class. I was proud of this attainment... Not alone this but my very excellent rating in my own physical education class set me firmly in the belief that some day I would like to coach."

This subject is teaching, receiving a rating of "below average" for efficiency and "average" for acceptability. Possibly he should have followed his "artistic" talents. Here is seen the influence of a teacher (coach), of responsibility and prestige in formation of a desire for a particular career.

5. "What to do after graduation was the problem that ran through my mind. I had taken the college preparatory course, and I knew that I wanted to continue my education. My mother and Aunt were both teachers and they gave me many advantages of the teaching profession. (There were also some disadvantages.) With the experience I had had in teaching Sunday School and Bible School I thought I would like teaching school. Still I had always enjoyed mathematics and after working in the C. G. State Bank one summer I had the notion that I would go to business school and be a stenographer. Then I decided I would combine my interests and be a commercial teacher... I have always liked working with small children and at one time thought of being a primary teacher. After visiting the first grade room at the M school I am more convinced that I would like the lower grades... I intend to look into it more thoroughly."

This subject is now teaching high school, receiving an "average" for efficiency and "above average" for acceptability rating. In her case, her interests are not stable—although teaching has always been a liking, she has also considered commercial work, and now is thinking of primary teaching.

6. "My mother and some of my high school teachers were the ones who encouraged me to go to the University."

TABLE XLVIII

MEAN RANK OF FOURTEEN OCCUPATIONS IN REGARD TO REASONS FOR CHOICE AS REPORTED BY THE WOMEN'S GROUP (N = 63)

		Financial Reward	Ease of Education	Security/Job Loss	Attractive Surroundings	Working Hours Vacations	Professional Advancement	Serve Society	Prestige Respect	Ease to get Job	Favorite Interest	Variety Activities	Interesting Co-workers	Lack of Physical Strain
Secretarial	Mean	10.33	2.83	9.63	5.44	4.34	9.65	12.00	11.68	4.25	7.45	10.00	9.97	4.05
	S.D.	3.32	2.91	3.21	2.93	3.52	3.78	2.81	2.61	3.70	4.48	4.00	3.82	3.37
Journalism	Mean	8.34	7.11	9.31	8.76	8.31	7.80	8.23	9.06	10.51	6.74	5.48	5.26	8.40
	S.D.	3.25	2.18	2.57	3.65	3.15	3.33	2.83	2.71	3.14	3.19	3.25	3.15	3.33
Medicine	Mean	2.94	12.69	1.98	8.30	11.57	3.88	1.83	.94	5.14	7.60	8.17	6.02	11.77
	S.D.	2.61	3.58	1.73	4.51	4.33	2.77	2.23	.34	4.52	5.31	4.33	3.95	3.44
Nursing	Mean	8.57	9.48	3.20	8.32	11.57	9.30	3.31	4.60	4.02	8.34	7.11	7.77	11.71
	S.D.	1.87	3.27	2.24	4.17	2.34	4.42	2.33	3.42	3.37	4.50	3.80	3.80	2.47
Entertainment	Mean	6.57	3.91	12.20	10.71	8.80	7.17	8.54	8.88	11.00	5.91	6.05	3.94	10.65
	S.D.	4.80	3.02	3.32	3.66	4.28	4.37	3.07	4.01	3.63	4.48	3.69	2.70	2.80
Social Work	Mean	11.14	8.37	8.09	12.53	10.65	9.86	3.60	5.83	8.17	8.43	3.89	6.71	9.60
	S.D.	2.89	3.28	3.22	2.36	2.47	3.63	2.35	2.32	3.36	3.57	2.35	3.43	3.00
Lab. Technician	Mean	7.14	7.77	4.77	7.02	7.38	8.00	6.66	7.42	6.14	7.22	16.88	9.71	6.17
	S.D.	4.41	4.78	3.28	3.42	2.62	3.00	2.46	3.43	2.56	3.52	3.61	3.25	3.17
Business Manage.	Mean	3.74	7.42	7.60	5.51	5.54	4.60	9.74	7.77	10.91	7.82	6.05	6.38	6.44
	S.D.	2.97	2.75	1.64	3.60	3.01	3.19	2.62	1.65	1.95	3.60	3.12	2.78	3.08
Sales	Mean	8.36	4.60	10.26	8.71	6.67	7.28	10.62	10.82	6.14	9.51	7.08	8.68	8.00
	S.D.	3.51	2.82	2.62	2.91	2.28	3.07	2.44	2.96	3.21	2.30	2.77	2.73	3.19
Designing	Mean	5.20	7.00	9.94	6.68	5.11	6.74	10.60	8.71	10.25	5.31	8.20	8.32	4.63
	S.D.	2.73	3.19	2.51	3.09	2.33	3.18	2.24	3.07	2.53	3.19	3.42	3.73	2.77
Advertising	Mean	4.91	6.48	10.30	7.54	5.94	5.74	10.88	9.20	9.47	7.02	7.48	6.82	5.69
	S.D.	2.63	2.41	1.91	2.83	3.00	3.51	2.60	2.58	2.59	3.12	3.05	3.42	2.51
Library	Mean	10.41	8.53	6.34	5.43	5.37	10.31	6.68	8.03	6.43	6.71	8.94	10.09	4.77
	S.D.	3.38	3.70	2.76	3.21	2.94	2.21	2.87	3.83	2.55	5.24	3.91	3.17	3.59
Dietetics	Mean	7.31	9.57	5.57	5.42	7.55	7.42	7.20	8.02	6.31	9.35	10.43	10.25	5.97
	S.D.	2.88	2.28	2.63	3.27	2.89	3.28	2.37	2.96	2.80	2.64	2.78	3.26	3.02
Education	Mean	8.60	7.62	4.80	4.05	3.97	7.02	2.97	3.20	6.20	4.22	3.71	4.82	5.62
	S.D.	3.91	3.42	3.42	3.71	3.81	3.63	2.27	1.72	3.08	3.62	2.78	3.13	2.46

TABLE XLIX

RANK ORDER OF FOURTEEN PROFESSIONS IN REGARD TO REASONS FOR CHOICE OF OCCUPATION AS REPORTED BY THE WOMEN'S GROUP
(N = 37)

	Financial Reward	Ease of Education	Security/Job Loss	Attractive Surroundings	Work Hours Vacations	Professional Advancement	Serve Society	Prestige Respect	Ease to get Job	Favorite Interest	Variety Activities	Interesting Co-workers	Lack of Physical Strain
Secretarial	12	1	10	3	2	12	14	14	2	8	12	12	1
Journalism	8	6	9	12	10	9	8	11	12	5	3	3	10
Medicine	1	14	1	9	13.5	1	1	1	3	9	6	4	14
Nursing	10	12	2	10	13.5	11	3	3	1	11	8	8	13
Entertainment	5	12	14	14	11	6	9	10	14	3	4.5	1	12
Social Work	14	10	8	13	12	13	4	4	9	12	2	6	11
Laboratory Technician	6	9	3	7	8	10	5	5	4.5	7	14	11	8
Business Management	2	7	7	5	5	2	10	16	13	10	4.5	5	7
Sales	9	3	12	11	7	7	12	13	4.5	14	7	10	9
Designing	4	5	11	6	3	4	11	9	11	2	10	9	2
Advertising	3	4	13	8	6	3	13	12	10	6	9	7	5
Library	13	11	8	3	5	14	6	7.5	8	4	11	13	3
Dietetics	7	13	5	3	9	8	7	7.5	7	13	13	14	6
Education	11	8	4	1	1	5	2	2	6	1	1	2	4

This subject is male, and is teaching at present. His efficiency is "average", and acceptability "above average".

7. "I know I would enjoy working with high school people. I like teacher's hours, and while the pay isn't the best, it is satisfactory and improving."

Male subject; not teaching.

8. "One teacher who was extremely well liked (Jr. H. S.) was the history and gymn teacher... From this man I can see the direct beginnings of my liking for American History, the course he taught and the course I am presently majoring in... His method of teaching was not one of bored disdain, but one of virile interest, a form of interest which he had the unmistakable ability to transfer to his students... I can't think of a teacher who had more lasting effect on me."

This man is now teaching history, and received an efficiency rating of "above average" and acceptability rating of "outstanding." Here again is seen the influence of teachers in molding the interests of their students, even to the point of shaping a desire for a career in line with these interests.

9. "The dominant influences in my school career are centered around music. The fact that I lived in a College town enabled me, in my entire school career, to hear lectures, concerts, recitals and other intellectual programs. I came in direct contact with the present college faculty at that time and former faculty members, in my private study of piano and voice. Much of the encouragement I received came from these people. From my sophomore year to my senior year in high school I sang at various college functions, and also sang with college students. This was because of the matureness of my voice and the rareness of tenors. This was a tremendous influence, and I knew that I wanted to go to college and knew what course I would approach long before I started my college career."

This man is now teaching music, and has received an "above average" rating in both efficiency and acceptability. Here are seen the influences of location, environment, and unusual aptitude.

10. "College days came and I was off to Wisconsin. I had no idea that I wanted to study so enrolled in the College of Letters and Science. I had a slight thought that at that time I wanted to enter the Physical Education School, but I thought it would hurt my parents' feelings if I didn't enter some school that would prepare me for the business world so I could follow in my father's footsteps. So I switched over to commerce school but had very little success because I wasn't happy in that particular field. It took football here as a freshman, football in the service, professional football and the fact that I was married and became a father that I must provide for that best I get into something that I was interested in and will most likely have the most success so I chose Physical Education."

This man is now coaching, receiving a rating of "above average" in efficiency, and "outstanding" in acceptability. Here is seen the effect special ability (and success) has in influencing choice of career. Again, knowledge of ability and interest came early. In his case, though his real interests were at first weakly expressed, then thwarted, he finally returned to the career in which he showed ability and is doing well.

C. Conclusions Drawn From Autobiographies

Examination of the autobiographies available leads to the belief that in the case of most of the subjects, interest in a particular subject matter field came at an early age, though it was not always crystalized into a desire to teach in that area until later high school or even college days. Success, proven ability, bolstered by encouragement from parents, teachers, and friends proved to be deciding influences in the choice of a career.

Of note is the general comment of these subjects to the effect that some teacher of outstanding ability in motivation provided the first interest in a particular subject matter area. Implications for recruitment are seen in this regard, and it is felt by the writer that the teacher as a recruiting agent for future teachers has been too much disregarded.

A further conclusion has been drawn in regard to the nature of the subjects' interest in teaching as a career. Apparently, from these autobiographies, it can be said that the interest lies in the subject matter area, rather than in youngsters, or in service to society, or any of the other reasons for choice used in the questionnaires and tests. Although teaching has its disadvantages as recognized in the autobiographies, it is an interesting field and is to be pursued for that reason.

It was not shown in the autobiographies that there is any relation between the nature of interest in teaching, the length of interest, or evident strength of interest insofar as it can be determined, and success in teaching.

TABLE L

CERTAIN INFLUENCES IN THE CHOICE OF TEACHING AS A CAREER

	Men	Women
Influenced by parents	12	15
Influenced by other relatives	5	9
Influenced by friends	14	7
Influenced by teachers	38	21
Influenced by counseling	17	9
Influenced by publicity of profession	4	2
Influenced by personal study of interests and abilities	50	25

TABLE LI

EXPECTED LENGTH OF TEACHING CAREERS OF MEN AND WOMEN SUBJECTS

	Men	Women
Teaching will be permanent life work	41	4
Teaching will be stepping stone to another occupation	14	2
Teaching will be occupation only until married (women)		1
Teaching will be occupation both before and after marriage (women)		36
No Data	8	..

TABLE LII

EXPERIENCES OF A TEACHING NATURE RECEIVED BY SUBJECTS

	Men	Women
Lead school classes on occasion	39	19
Worked as camp counselor	15	10
Lead children's clubs or extra-curricular activities	30	24
Taught Sunday School	13	18
Been substitute in public schools	..	..
Been regularly employed teacher	1	1
Other experiences of teaching nature	38	10

SECTION VI

SUMMARY AND CONCLUSIONS

A. Summary

SIXTY-THREE MEN and thirty-seven women undergraduates enrolled in a University of Wisconsin School of Education course in "The Nature and Direction of Learning" were used as subjects for this study. Three instruments, namely, a paired-comparison test, a ranking questionnaire, and a comparison questionnaire all asking essentially the same questions concerning beliefs of advantages of thirteen reasons for choice of teaching as a profession were administered. A year later, while the subjects were beginning teachers, sixteen men and eighteen women were visited by University observers and rated concerning their teaching efficiency and acceptability to the school system. The superintendent also rated each teacher for acceptability and efficiency.

These data were supplemented by the results of Strong Vocational Interest Blanks and autobiographies, written a year earlier.

Intercorrelations were found for the variables involved. Through factor analysis techniques, group factors were found for the paired-comparison test and the ranking questionnaire. Multiple correlation coefficients were computed for the relationship between efficiency and acceptability and the paired-comparison and ranking instruments.

1. Summary of Factor Analysis

For the men's paired-comparison test factors were found which were labelled "Interest in Security," "Interest in Working Conditions", "Self Esteem", "Academic Interests", "Interest in People", and "Self Interest."

For the women's paired-comparison test the factors found were labelled "Welfare", "Interest in Security", "Interest in Pleasurable Activities", "Interest in Teaching as a Worthwhile Profession", "Aggressiveness", and "Interest in Agreeable Working Conditions".

For the men's ranking questionnaire, factors were found which were labeled "Enjoyment of Work", "Interest in Working in a Social Atmosphere", "White Collar Interests", "Welfare", "Expediency", and "Interest in Professional Advancement".

For the women's ranking questionnaire factors were found which were labelled "Economic Interest", "Welfare", "Intellectual Interest", "Interest in Pleasurable Activities", "Interest in Security", and "Expediency, or Temporariness".

2. Conclusions from Factor Analysis

The following conclusions are drawn from examination of the factor analyses made in this study:

1. Although factors bearing similar labels were found in analyzing the results from each test for men and women, the factors are only broadly alike in that different emphases were given factors of "Security", "Welfare", and the like through differing arrangements and loadings of variables. An interest in "Security" as interpreted from the men's paired-comparison test is not precisely that interpreted from the women's paired-comparison test.

2. Interests in working conditions, in people, in security, and in the subject matter area to be taught seem generally emphasized by the methods used in this study.

3. Desire for professional advancement does not appear to be a general characteristic of the factor structure, nor do desires for service to society or prestige and respect of the profession.

4. The paired-comparison test and rank questionnaire produce scores which are difficult to understand in terms of factor analysis, due to the circularity of the instruments. A negative correlation between two variables cannot be properly interpreted, as the construction of the instrument tends to make at least some negative correlations necessary.

5. Since the application of methods of direct rotation to factor structure produced many large negative loadings, radial rotation was further used. This compromise structure cannot be said to adequately describe the variables in terms of factors, since variables of complexity one did not appear as often as expected in terms of Thurstone's criteria for simple structure.

B. Results of Comparing Test Results with Efficiency and Acceptability Ratings

1. Summary of Results

It was found in this study that the correlations of acceptability and efficiency ratings for men was .90 and for women, .82. Differences in mean ratings were .25 for men and .78 for women, acceptability ratings being higher than those for efficiency.

Multiple correlation coefficients between acceptability and raw scores in the men's paired-comparison test were .84, and for the women's test, .44. Multiple correlation coefficients between acceptability ratings and raw scores for the ranking questionnaire were .76 for men and .78 for women.

In terms of raw scores, men placed interest in subject matter first and service to society second as reasons for choice of teaching as a profession. Women reversed this order. Items in eleventh, twelfth, and thirteenth place, in order of choice were lack of physical strain, ease of getting education, and ease of getting a position, generally, although eleventh and twelfth rank orders varied somewhat between the instruments.

2. Conclusions

1. There is merit in examining the type of reason for choice of teaching as a profession as related to teaching efficiency and acceptability. Multiple correlation coefficients found in this study are judged fairly large, especially when it is considered that other factors than interest were not considered in relation to teaching acceptability.

C. Strong Vocational Interest Blank

1. Summary

The Strong Vocational Interest Blank results were found to have little or no relationship to teaching success in terms of the treatment used in this study.

Factors found in the Strong Interest Blank by Darley were found to correspond in terms of "Welfare" to factors found in this study. Other factors seem to have no interpretable relationship.

2. Conclusions from Study of Strong Vocational Interest Blank

1. The categories used in the Strong Blank are not suited, according to the findings of this study, for comparison with teaching efficiency.

2. Little relationship was found between factors of the Strong blank and factors found in this study, except for interest in "Welfare, or Uplift" factors.

D. Autobiographical Material

1. Summary

Interest in teaching was found to be largely centered in subject matter areas. This interest was ordinarily attained at a relatively early age, and stimulated by parents or particularly good teachers. Study of individual fitness had been made in most cases. Determination to teach, however, often did not come until college days.

2. Conclusions

1. Good teachers stimulated in most of these subjects an interest in a subject matter area which often culminated in the determination to teach.

2. Interest in subject matter was found to be related to abilities of the subjects. Success or achievement at an early age appeared to have influence in choice of career.

3. Interest in a subject matter area was found to be the most often mentioned reason for determining to teach.

E. General Conclusion

It is believed by the writer that teachers are motivated to teach by certain wants, reasons, and values even though these may not all be the same for all teachers. Results of this study tend to substantiate the belief that teaching success is related to the nature of the reasons for choice of teaching. The writer believes that further work in this area in refining the instruments for testing, in refining statistical techniques used, in examination of the results of factor analyses, and in the use of sampling studies for prediction would bear fruit.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233)

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1. The names and addresses of the publisher, editor, managing editor, and business managers are:

	Name	*Address*
Publisher	Dember Publications, Ind.	Madison, Wisconsin
Editor	A.S. Barr	Madison, Wisconsin
Managing editor	A.S. Barr	Madison, Wisconsin
Business manager	Walter A. Frautschi	Madison, Wisconsin

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

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A. S. Barr	Madison, Wisconsin
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None	

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.) .....

Walter A. Frautschi
(Signature of editor, publisher, business manager, or owner)

Sworn to and subscribed before me this 22 day of September, 1952

[SEAL]

Jean W. Williams

(My commission expires ....., 19.....)

My Commission Expires May 10, 1953

PRACTICE TEACHING SUCCESS IN RELATION TO OTHER MEASURES OF TEACHING ABILITY

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SECTION I

INTRODUCTION

Statement of the Problem

EVALUATION is an integral part of our present concept of education. In teacher education there is "evaluation of students by teachers, evaluation of teachers by supervisors and administrators, evaluations by teachers of their own courses, evaluations by students or teachers of their own progress, and evaluations of major aspects of programs of teacher education."[1] Among the major evaluations made in the pre-service training of a teacher is the evaluation of his performance made while he is a student teacher. This evaluation of student practice teaching is considered an important aspect of the pre-service education of teachers.

The purpose of this investigation is to study the reliability of these ratings and their relationship to success in the first year of teaching.

Importance of the Problem

Among the major evaluations made in the training of teachers is that of practice teaching. Most institutions have accorded practice teaching a place in the professional training of teachers, presumably upon the assumption that there is some relationship between success in practice teaching and success in the field.

There are two possible modes of attacking the study of this relationship. The first is an experimental one in which an experimental group of students would not be given practice teaching as a part of its training. This method, while a possible design from the point of view of research methods, is not socially or legally acceptable, as state law requires that practice teaching be included in the teacher training program. Therefore, this study employs a second method of studying these relationships, namely, a correlational analysis of the relationship between success in practice teaching and success in the field.

Trustworthy evaluations are essential to effective learning. Careful definition of traits and definite goals provide the basis for trustworthy evaluation. It is the purpose of this investigation to determine the character of these evaluations.

College administrators also need to have additional information about their particular programs of practice teaching. Evaluation of the practice teaching program and practice teaching itself will provide some of this information. One method of evaluating a practice teaching program is to determine the relationship between practice teaching success and success in service. One purpose of this investigation is to determine this relationship.

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*The author has incurred many obligations in carrying out this study which he would like to acknowledge. In particular, he is indebted to A. S. Barr for his inspiration and constant encouragement and assistance throughout the course of this investigation; to C. W. Harris for suggestions and constructive criticisms in factorial methods; to Tom Lemke and Tom Ringness, co-workers in setting up the visitation program for Beginning Teachers; to G. G. Eye, Director of Student Teaching, for obtaining the grant which made the visitation program possible; to the Core Group of supervisors who "carried the brunt" of the visitation program; to John Goldgruber, Principal, and to the entire staff of Wisconsin High School for cooperation and help in obtaining data; to the faculty and staff of the Department of Education, fellow students, and all others who aided in the collection of data and offered critical and constructive suggestions; and to Theodora Bach, the author's wife, for continual assistance and encouragement.

1. Maurice E. Troyer and Robert C. Pace. Evaluation in Teacher Education (Washington, D. C.: American Council Education, 1944), p. 268.

SECTION II

DESIGN OF THE STUDY

Description of the Subjects

SEVENTY-SIX students who had graduated from the University of Wisconsin with the Teachers Certificate and who had obtained their first teaching positions in the State of Wisconsin in the fall of the year 1950 were chosen for this study. This group of students was thought to be representative in certain respects of those graduated from the University of Wisconsin.

The seventy-six cases consisted of thirty-three male and forty-three female students. The average age of the total group at graduation was twenty-three years and one month; the average male age was twenty-four years and three months, and the average female age was twenty-two years and two months. The range of ages was ten years with a standard deviation of twenty-five months. In all statistical operations, the male and female scores were pooled.

A tabulation of the majors and minors of these students is given in Table I.

The mean grade point average for the junior and senior years is 2.05, or slightly better than a B average. The mean total score percentile rank on the American Council on Education Psychological Examination is 65.8. The means of this group are fairly representative of University of Wisconsin students.

A common element in the training of all the students in this group was practice teaching experience at Wisconsin High School. Because of an increase in enrollment of prospective teachers in the post war years, the practice teaching facilities had become overcrowded. As many as six to ten practice teachers were assigned to the same class for practice teaching. A recent sample analysis of the laboratory experience for beginning practice teachers over a month's time showed 3.5 hours were spent observing the supervising teacher, 2.7 hours observing a student teacher, 2 hours working with one pupil, 3.1 hours working with small groups, and 2.2 hours teaching the entire class. Miscellaneous other activities such as preparing, administering and correcting tests, makeup work, class records, preparation of material and equipment, and conferences accounted for the remaining time. The beginning practice teacher receives a minimum of directed observation, contact with the supervising teacher, and opportunity to teach.

The Data Collected and the Devices Employed

The following data were collected from University records:

1. Ratings on Wisconsin High School Participator Rating Scale.
2. Grade point average, junior and senior years.
3. Professional grade point average less practice teaching grade.
4. American Council on Education Psychological Examination for College Freshmen Total Score Percentile Rank.
5. Practice teaching grade (first and second semesters).

The following data were collected from the beginning teacher visitation:

1. Principal's acceptability rating.
2. Principal's rating using Wisconsin High School Participator Rating Scale.
3. Principal's rating on Wisconsin Adaptation of the M Blank.
4. Two visiting supervisors' ratings on Wisconsin Adaptation of the M Blank.

Description of the Data Gathering Devices Employed

1. Rating Scales:

The writer believed that some improvement in the relationship between practice teaching ratings and in service ratings would result if a special scale were developed to rate teaching performance. Accordingly, such a scale[2] was developed following a study of the items found in rating scales used by secondary teacher training institutions accredited by regional and nationwide organizations in the United States. This scale was further revised and shortened by a committee of teachers at Wisconsin High School and adopted for use by the high school staff in January 1948. This scale (see Appendix)* consists of thirteen items as follows:

I. Appearance
II. Voice and Diction
III. Use of English
IV. Initiative
V. Adaptability
VI. Relations with Others
VII. Emotional Stability

2. The Evaluation of Student Teaching, 1949 Yearbook (Lock Haven, Pa.: Association for Student Teaching, State Teachers College, 1949), Ch. IX.

*All references to Appendices may be found in original thesis on file in Library, University of Wisconsin.

VIII. Grasp of Specific Subject Matter
IX. Professional Understandings
X. Skill in Analyzing Learning Problems and Selecting and Organizing Appropriate Learning Experiences
XI. Skill in Maintaining Pupil Interest, Purpose, and Attention
XII. Skill in Evaluation
XIII. Cooperative Attitude

The items were rated on a five-point scale with "one" the top rating, and "five" the lowest rating. Ratings were made at mid-term and at the end of the semester by the critic teacher and after four months of teaching by the beginning teacher's principal.

2. Grade Point Average for Junior and Senior Years:

This score was the result of averaging all grades for the junior and senior years on the basis of the number of credits per course. The scale used was: A = 3 points; B = 2 points; C = 1 point; D = 0 points; and E = -1 point. A maximum score was 3.00 or a straight A average. A high score indicated good grades.

3. Professional Grade Point Average less Practice Teaching Grade:

This measure was obtained by averaging the grades for Education 74, 74, and 75 (lecture section only) and the Methods Course. This score is a part of 2, above.

4. American Council on Education Psychological Examination for College Freshmen, 1945 edition:

This examination was administered to the entering freshmen during Orientation Week, 1946. It consists of six divisions: arithmetic, figure analogies, number series, completion, verbal analogies, and same-opposites. Each division is time tested with the entire test requiring one hour. Nation-wide norms are available and the total raw score is converted into a percentile rank. The percentile rank of the total score is used in this study. The Q and L scores were not used because of incomplete data.

The majority of scores used in this study are from the 1945 edition. The scores from other editions were also used and assumed to be comparable inasmuch as the authors "always try beforehand to make the scores experimentally equivalent."[3] The conversion of the raw scores to percentile scores also increases the comparability of the scores.

5. Practice Teaching:

The practice teaching grade is combined with the lecture section grade for both the first and second semesters of practice teaching on the college transcript. This grade is available on a special card kept on file in the education office at Wisconsin High School. This card contains, in addition to the practice teaching grade, a photograph of the student, a brief statement concerning the student's performance as a practice teacher, and a record of the rating on the items of the rating scale. The letter grades usually carry a plus or minus, so they were converted into numerical scores on the following scale: A = 1; A- = 2; B = 3; etc. A low score indicates a high grade.

6. Principal's Acceptability Rating of the Beginning Teacher:

Investigations of teaching success in the past have in the main centered around the criterion of efficiency as measured by standards of pupil gain, teacher behavior in the classroom, and teacher-pupil relations.[4] It is the writer's belief that the teacher's classroom activities are only a part of her responsibilities to the school system and that teaching success is measured also by the relationships of the teacher to the community, staff, parents, and administration. These combined relationships, plus the principal's "liking" for the teacher, constitute a criterion, which can be defined as a "criterion of acceptability." If a teacher is deficient in any of the areas mentioned, she is not likely to be characterized as a good teacher. Acceptability is accordingly here defined as the quality of the teacher which leads other people to feel that she should be retained in her present position or possibly promoted to a more responsible assignment. The reason for this feeling may be varied depending upon the situation and the persons involved. The principal was asked for this rating during the Beginning Teacher Visitation Interview.

As far as is known, this criterion is new. It was cooperatively defined by Tom Lamke, Tom Ringness, and the writer, all of the University of Wisconsin. The criterion is currently being employed in two other investigations.

3. Oscar Krison Buros, 1948 Mental Measurements Yearbook (New Brunswick, N. J.: Rutgers University Press, 1948), p. 297.

4. A. S. Barr, "The Measurement and Prediction of Teaching Efficiency: A Summary of Investigations," Journal of Experimental Education, XVI (June 1948), 81 pp.

7. Wisconsin Adaptation of the M Blank:

The Wisconsin Adaptation of the M Blank (see Appendix) has been used in several recent Wisconsin studies. The rating under the item "General Evaluation" was the score used in this study. The ratings were classified as follows: 1. outstanding; 2. above average; 3. average; 4. below average; and 5. poor. A low score indicates a high rating. Two visiting supervisors and the beginning teacher's principal made individual ratings on the M Blank.

8. Beginning Teacher Visitation:

During the second half of the fall semester of 1950, teams of supervising teachers from the University of Wisconsin visited each beginning teacher in the field. Six graduate students from the University of Wisconsin, especially trained for the assignment, formed the core of the visiting group. At least one person from this group was included in every team that visited schools and he conducted the interview with the principal to get the acceptability rating. Before the principal was asked for this rating of the teacher, the following questions were asked:

a. How do you like this teacher?
b. Does she get along well with the students?
c. Do the parents feel the same way as the pupils do about the teacher?
d. Is the teacher happy here? Does she have friends on the faculty, in the community?
e. Does the teacher have any weaknesses or strengths?
f. In terms of beginning teachers with whom you have worked in the past, and in light of our discussion, would you consider this teacher as 1) among the best, 2) above average, 3) average, 4) below average, or 5) failing as a teacher?

The acceptability rating was determined from the principal's response to question "f". A low score indicates a high rating.

By using this standardized interview, the principal was led to consider certain of the more important phases of the teacher's relationship before he was asked to rate the teacher. The weighting of the various phases was based on the principal's interpretation of the community's standards. The number assigned to the responses to question "f" is the acceptability rating score. After giving the acceptability rating the principal was asked to rate the beginning teacher on both the participator rating scale and the M Blank. The visiting supervisors visited the beginning teacher during the same class period (to increase the reliability of their ratings) and also rated her using the M Blank.

Treatment of the Data

Success in practice teaching is measured by practice teaching grades and by pre-service ratings by supervising teachers on the participator rating scale. In this investigation, success in teaching is defined in terms of ratings as follows:

1. Principal's acceptability rating.
2. Principal's rating on the Wisconsin High School Participator Rating Scale.
3. Principal's rating on the Wisconsin Adaptation of the M Blank.
4. The visiting supervisors' ratings on the Wisconsin Adaptation of the M Blank.

Three types of data were collected: measures of a) pre-service ability; b) practice teaching success; and c) success in the job. We are concerned with the relationships between a) and b), a) and c), and b) and c). Specifically, the following questions will be answered:

1. What relationship is there between success in practice teaching and such pre-service measures of ability as
   a) Professional grade point average (practice teaching grade omitted)?
   b) Academic grade point average for junior and senior years?
   c) American Council on Education Psychological Examination?

2. What relationship is there between academic pre-service measures of ability and in-service ratings of efficiency and acceptability?

3. Is practice teaching success a better indicator of teaching success than the professional grade point average (practice teaching grade omitted)?

4. How well does success in practice teaching as measured by scores on the Participator Rating Scale correlate with success in first year teaching?

5. Is there any agreement in the factor patterns of critic teacher and principal ratings?

In order to answer the above questions satisfactorily the reliability of the various measures need to be determined. The following secondary questions therefore will be asked:

1. How do the mid-semester and final ratings of student teachers on the Participator Rating Scale correlate?

2. Are grades in first semester practice teaching significantly related to second semester practice teaching grades?

3. Will standardizing the first and second

semester grades on the basis of grading tendencies of individual teachers increase the correlation?

4. How do the final practice teaching ratings correlate with the principal ratings (participator rating scale) at the end of four months of teaching?

5. How do various measures of in-service success and acceptability correlate among themselves?

The analysis of the data was accomplished by following standard statistical techniques. Pearson product-moment correlations were used to:

1. Find the intercorrelations of the field ratings to determine the consistency or reliability of these ratings.
2. Determine the reliability of the item rating by correlating mid-semester and final ratings on the Participator Rating Scale.
3. Show the relationship between item ratings on the final supervisor's rating and the principal's rating in the field.
4. Show the relationship between practice teaching grades for the first and second semester in both raw score form and when converted to standard scores (on the basis of the mean and standard deviation of the grades given by that critic teacher during the past five years).
5. Determine the intercorrelation of traits on supervisor's ratings on the Participator Rating Scale.
6. Determine the intercorrelations of traits on principals' ratings on the Participator Rating Scale.

The two tables of intercorrelations, items five and six above, were analyzed factorially to determine the factor pattern of each table and to compare the two factor solutions.

SECTION III

THE CORRELATIONAL ANALYSIS

THE STATISTICAL technique most generally used in this study to show relationships between various sets of scores is the coefficient of correlation. Throughout this study the coefficients of correlation presented will be the Pearson product-moment coefficients of correlation.

In order to answer the questions asked earlier in this tudy, the reliabilities of the various measures need to be determined. The reliability of measurements is a fundamental tenet in all scientific research. The most commonly used method of determining the reliability of a test or measuring device is through the calculation of the product-moment correlation coefficient. However, as Barr[5] has stated, a coefficient of correlation cannot be taken at face value; it is the product of many factors and needs careful interpretation. It represents "going togetherness" and not causal relations.

Cronbach[6] has examined the various concepts of test reliability and has listed various definitions of reliability. The usual definition of reliability is made in terms of the variation of scores obtained by the individual on successive individual testings. This definition, however, violates two important assumptions of reliability made by the physical scientist, namely, 1) that the entity being measured does not change during the measurement process, and 2) that there is independence of measurement. The first assumption is violated because no two behaviors are the same; the second because successive measurement of psychological quantities are rarely independent since the act of measurement may change the quantity. However, by making various assumptions, which we may or may not be able to test, we can obtain statistics which are useful in describing tests. Different assumptions lead to different types of coefficients which Cronbach[7] defined as follows:

> 1) Reliability is the degree to which the test score indicates unchanging individual differences in any traits (coefficient of stability).
> 2) Reliability is the degree to which the test score indicates unchanging individual differences in the general and group factors defined by the test (coefficient of stability and equivalence).
> 3) Reliability is the degree to which the test score indicates the status of the individual at the present instant in the general and group factors defined by the test (coefficient of equivalence).

5. Ibid., pp. 23-24.

6. Lee J. Cronbach, "Test Reliability: Its Meaning and Determination," Psychometrika, XII (March 1947), pp. 1-17.

7. Ibid., pp. 5-6.

TABLE I

MAJORS AND MINORS OF PARTICIPANTS

Field	Majors	Minors	Positions
English	19	5	22
History (Social Studies)	12	14	11
Physical Education	12	1	8
Home Economics	8	—	7
Art	6	—	5
Science	5	25	4
Speech and Speech Correction	5	3	4
Foreign Language	3	9	1
Business Education	3	—	3
Music	2	—	2
Mathematics	1	3	2
Miscellaneous	—	—	7
Total	76	60	76

TABLE II

CORRELATION BETWEEN MID-SEMESTER AND FINAL RATINGS ON PARTICIPATOR RATING SCALE

	Trait	Correlations
I	Appearance	.696*
II	Voice and Diction	.713
III	Use of English	.656
IV	Initiative	.613
V	Adaptability	.545
VI	Relations with Others	.597
VII	Emotional Stability	.621
VIII	Grasp of Specific Subject Matter	.741
IX	Professional Understanding	.638
X	Skill in Analyzing Learning Problems and Selecting and Organizing Appropriate Learning Exercises	.524
XI	Skill in Maintaining Pupil Interest, Purpose, and Attention	.687
XII	Skill in Evaluation	.539
XIII	Cooperative Attitude	.527

*Since this is a descriptive investigation we shall be unable to make probability statements about some defined population. If it were an inferential study a correlational coefficient would have to be equal or greater than .225 to be statistically significant at the five percent level and equal or greater than .297 to be statistically significant at the one percent level.

Betts[8] cites three possible sources of unreliability in any study in which the judgment of one person, or one situation is recorded by some particular person. These are: 1) the person making the judgment or observation; 2) the person or situation on whom the judgment is made or the observation taken; and 3) the instrument employed. From this list it is obvious that the reliability estimate may refer to the person making the rating and his accuracy of judgment or observation, the constancy of the person or situation being rated, or the instruments employed. In this study, we are primarily concerned with the rating instrument.

One aspect of a rating device which increases its reliability is its objectivity. An effort has been made to increase the objectivity of the participator rating scale used in this study by defining the traits at three different levels (superior, average, poor) on its five point scale.

Correlations Between the Mid-Semester and Final Ratings of Student Teaching on the Participator Rating Scale

Each practice teacher was rated on the thirteen traits of the Participator Rating Scale by the supervising teacher at the mid-point and at the end of his first semester of practice teaching. The two ratings were made with a time interval of approximately eight weeks, by the same rater, using the same rating scale. The correlations (N = 76) between the mid-semester and final ratings on the same traits are shown in Table II.

The coefficients listed above are substantial, with the lowest, .524, and the largest, .741. The coefficient of .741 on trait VIII, "Grasp of Specific Subject Matter," is the highest relationship found between the ratings. On this item there is little chance for much individual improvement, therefore it may be taken as an example of a coefficient of stability according to Cronbach's definition.[9] An examination of the trait with the lowest coefficient, .524, "Skill in Analyzing Learning Problems and Selecting and Organizing Appropriate Learning Exercises," may give a clue as to the probable reason for its position. On this item there is possibility for considerable individual improvement or change as a result of observation and experience. The coefficients between these extremes are influenced in varying amounts by a change in the rater's opinion, change in the ratee's behavior, observer error, and "just plain" chance variations such as the popular use of the word "unreliable" implies.

Correlations Between First and Second Semester Practice Teaching Grades in Raw and Standardized Form

The practice teaching grades were assigned by supervising teachers at the ends of two different semesters. Numerical scores were assigned to the letter grades using the following system: A = 1; A- = 2; B = 3; etc. The coefficient of correlation (n = 65) between first and second semester practice teaching grades was -.536.

This coefficient would appear to show a significant relationship between the two grades, as indeed it should. A total of thirty-one different supervising teachers was involved in assigning these scores. Sometimes the student had the same supervising teacher for both semesters of his practice teaching, sometimes he did his teaching in the same department, but had a different supervising teacher, and at other times the student moved to another department with a new supervisor for his second semester of teaching. This made for considerable variation in the grading as one would expect. In order to eliminate some of the discrepancies, the writer attempted to standardize the grades of supervising teachers by using the following method. All grades assigned by the supervising teachers from 1946 through 1950 were tabulated. The means and standard deviations were calculated and sigma values determined for each grade and for each supervising teacher. Substituting the corresponding sigma values for the practice teaching grades, a second coefficient of correlation was calculated. The coefficient of correlation between the two grades was found by this treatment to be .550 which is less than that obtained from the raw scores.

Correlation Between Practice Teaching Rating and Principal Ratings (at the End of Four Months of Teaching) on the Participator Rating Scale

During the beginning teacher visitation each principal was asked to rate the beginning teacher on the Participator Rating Scale, also used by the University High School faculty in making their ratings. The ratings on the thirteen traits were then correlated. The coefficients (N = 76) are shown in Table III.

The correlations for the two ratings were not high. These ratings are on the same people, using the same scale, but with different people do-

8. Gilbert L. Betts, "Reliability and Validity of Measures of Teaching Ability or Teaching Success," Special Survey Studies National Survey of the Education of Teachers, Vol. V, Bulletin No. 10 (Washington, D.C.: U. S. Office of Education, Department of Interior, 1935), pp. 117-153.

9. Lee J. Cronbach, Ibid., pp. 3-4.

TABLE III

CORRELATIONS BETWEEN PRACTICE TEACHING GRADES AND IN-SERVICE RATINGS

	Trait	Correlations
I	Appearance	.115
II	Voice and Diction	.276
III	Use of English	.109
IV	Initiative	.158
V	Adaptability	.231
VI	Relations with Others	-.027
VII	Emotional Stability	.009
VIII	Grasp of Specific Subject Matter	.181
IX	Professional Understandings	.148
X	Skill in Analyzing Learning Problems and Selecting and Organizing Appropriate Learning Experiences	.086
XI	Skill in Maintaining Pupil Interest, Purpose, and Attention	-.061
XII	Skill in Evaluation	.093
XIII	Cooperative Attitude	.023

TABLE IIIA

CORRELATION COEFFICIENTS (N = 73) BETWEEN IN-SERVICE MEASURES OF SUCCESS

		I	II	III	IV
I.	Principal's Acceptability Rating	1.000			
II.	Principal's M Blank Rating	.528	1.000		
III.	Supervisor I's M Blank Rating	.390	.484	1.000	
IV.	Supervisor II's M Blank Rating	.389	.435	.549	1.000

TABLE IIIB

CORRELATION COEFFICIENTS BETWEEN IN-SERVICE AND PRE-SERVICE MEASURES

	PTG-I (N = 73)	PGPA-PT (N = 70)	AGPA-JrSr (N = 69)	ACE-TPR (N = 55)
Principal's Acceptability Rating	.06	.09	-.01	-.01
Principal's M Blank Rating	.20	-.02	-.06	-.10
Supervisor I's M Blank Rating	.18	-.08	.08	-.01
Supervisor II's M Blank Rating	.12	-.01	.00	-.08

ing the rating and with a time lapse of approximately one year. The low correlations indicate either (1) that this scale does not adequately describe the traits involved such that the element of human error in observation and judgment is overcome, or (2) that there was a considerable change in the individuals rated, or (3) that the supervisor's standards of evaluation shifted from one rating to another. A combination of these three is the most reasonable explanation of the low correlation.

If one regards practice teaching and/or first year teaching as non-repeating events which can be observed only once, as indeed they are in a sense of the word, reliability has no meaning for there is no "error" in the measurement of a unique event.

Correlations Between Measures of In-Service Success and Acceptability

In addition to the principal's rating on the Participator Rating Scale already mentioned, three additional measures of in-service success were used: (1) an efficiency rating on the M Blank by the principal; (2) an efficiency rating by the two visiting supervisors on the M Blank; and (3) the principal's acceptability rating. If only one member of the core group was on the visiting team of supervisors, his rating became Supervisor I's rating. If both members of the visiting team of supervisors were from the core group, classification as Supervisor I or II was made alphabetically.

The intercorrelations (N = 73) for the four in service measures of success just mentioned is presented in Table IIIA.

When more than one in-service measure of success is used it becomes necessary to check relationships or overlap existing among the criteria. Of special interest is the relationship found between the principal's Acceptability rating and the "Efficiency" rating on the M Blank. The coefficient of .528 indicates that although there is considerable overlap or measurement of the same attribute, there also is uniqueness or difference in the two ratings. The observation of the author is that while many ratings by the principals on the two criteria were the same, the tendency was to rate toward the extremes on acceptability and one point nearer the mean on efficiency. The means of the two ratings were approximately the same (2.16 for I, Acceptability, and 2.18 for II, M Blank), but the standard deviations (1.09 for I, Acceptability, and .895 for II, M Blank) show the greater variability of the acceptability criterion.

The agreement in relative size of the coefficients for the two supervisor ratings on the M Blank with Acceptability (.390 and .389) and with the Principal's M Blank rating (.484 and .435) indicate that the method of classifying the supervisory ratings tended to average them. The coefficient of correlation between the various M Blank ratings in this study fall within the extremes of the relationships found by Lins[10] in his study. The coefficients between a composite M Blank rating and the five individual ratings of which it was composed, ranged from .403 to .880.

Correlations Between the In-Service Criteria and Pre-Service Measures

The in-service measures of teaching success were correlated with four measures of pre-service ability. These measures, described in Section II, are the practice teaching grade (PTG-I), professional grade point average with the practice teaching grade omitted (PGA-PT), academic grade point average for the junior and senior years (AGPA-JrSr), and the total score percentile rank on the American Council on Education Psychological Examination (ACE-TPR). Table IIIB presents the correlations between the in-service and pre-service measures.

The coefficients of correlation show only a very slight relationship between these particular in-service and pre-service measures of ability. The highest coefficient is found between the practice teaching grade and the principal's M Blank rating which is .20. It is interesting to note that the correlation between the American Council on Education Total Score Percentile Rank (ACE-TPR) scores and in-service ratings are all negative. All the correlations between the Professional Grade Point Average minus Practice Teaching (PGPA-PT) scores and in-service ratings except for the Principal's Acceptability Rating are also negative.

Correlations Between First Semester Practice Teaching Grade and Pre-Service Measures of Ability

In addition to the correlations between first and second semester Practice Teaching grades, the first semester grade was also correlated with Professional Grade Point Average (with Practice Teaching grade omitted, PGPA-PT), the Academic Grade Point Average for Junior and Senior years (AGPA-JrSr), and the Total Score Percentile Rank on the American Council on Education Psychological Examination (ACE-TPR). The coefficients of correlation between the first semester practice teaching grade and the above pre-service measures were as follows:

10. Leo J. Lins, "The Prediction of Teaching Efficiency," Journal of Experimental Education, XV (1946), pp. 2-60.

PGPA-PT	.194
AGPA(JrSr)	.615
ACE-TPR	.002

The relatively high coefficient between first semester practice teaching grade and the academic grade point average for Junior and Senior years is relatively the same size as the relationship between first and second semester practice teaching grades, namely .636. The size of the correlation is doubtless due in part to the fact that the practice teaching grade is a part of the academic grade point average. It is, however, only a very small part of the whole. Apparently the ability to make good grades in academic courses is related to good grades in practice teaching, particularly among participators at Wisconsin High School.

Summary and Conclusions

The purpose of the correlational analysis here presented is to determine the relationships among and between the various pre-service and in-service measures of teaching ability. The coefficients of correlation between the mid and final semester ratings of the first semester practice teaching were substantial, ranging from .524 to .741. The relationship between the grades for first and second semester practice teaching was .636. This decreased to .550 when the scores were changed to standardized scores. The relationship between the final ratings for practice teaching and ratings on the Participator Rating Scale for the first semester of in-service teaching on the same traits was slight, ranging from .276 to -.061.

The relationships between the four in-service measures ranged from .549 to .389. The highest relationship was between the ratings of the two visiting supervisors with the Principal's Acceptability and M Blank ratings (.528). The lowest in-service relationship was found between the visiting supervisors' ratings and the Acceptability ratings.

When the in-service criteria were correlated with the pre-service measures of teaching ability (except the practice teaching ratings) the coefficients were uniformly low. The largest coefficient (.20) was between the principal's M Blank rating and the first semester practice teaching grade. Slight negative coefficients were found between the American Council on Education Total Score Percentile Rank and all the in-service measures.

Accordingly, the first four questions asked in Section II may be answered as follows:

1. The relationship between first semester final Practice Teaching Grade and the pre-service measures of ability was relatively high (.615) for Academic Grade Point Average Jr. and Sr. years; low (.194) for Professional Grade Point Average; and near zero (.002) for the American Council on Education Psychological Examination Total Score Percentile Rank. Of the above named pre-service measures of ability, Academic Grade Point Average is closely related (.615) to the Practice Teaching Grade.

2. Practice teaching success, as measured by first semester practice teaching grades, shows a higher relationship than the Professional Grade Point Average to all in-service measures, except with Acceptability rating, but the coefficients were all low and near zero. It may be interesting to note that, with the exception of the Acceptability Rating already mentioned, all the coefficients between the Professional Grade Point Average (minus Practice Teaching) and the in-service measures of success are negative (though small) while those of the first semester Practice Teaching Grade and in-service measures of success are all positive and small.

3. The relationships between pre-service measures and the in-service criteria of success are all near zero ranging from -.10 to .06. The American Council on Education Total Score Percentile Rank coefficients with the in-service criteria are all negative.

4. The relationships between the same traits on the first semester final practice teaching and the principal's rating are all slight. Only two of the thirteen traits have coefficients of over .2 while two have negative coefficients. In view of these low coefficients, the author is inclined to question a basic assumption, namely, that practice teaching and actual teaching are comparable activities.

In Section IV the writer will discuss the factor patterns found in the final supervisory and principal ratings on the Participator Rating Scale.

SECTION IV

THE FACTOR ANALYSIS

THE QUESTION for discussion in this section "Is there any agreement in the factor patterns of critic teacher and principal ratings?" will be treated in the following manner. First, a brief summary of the general nature of factor analysis will be given. This will be followed by a description of the centroid method of factoring and the methods of rotation used in this study. The final portion of the section will deal with the two factor analyses and the interpretation and comparison of the two solutions.

General Nature of Factor Analysis

"Factor analysis is a branch of statistical theory concerned with the resolution of a set of

descriptive variables in terms of a smaller number of categories or factors. This resolution is accomplished by the analysis of the intercorrelations of the variables."[11] The intercorrelations used in this study are those of the thirteen traits listed on the Participator Rating Scale. Each variable is a description of an ability and may be represented as a combination of underlying factors by a simple linear equation written in the form:

(1)

$$Z_j = a_{j_1}F_1 + a_{j_2}F_2 + a_{j_3}F_3 + \ldots + a_{jm}F_m + a_jU_j$$

where Z_j is the variable and F_1, F_2, $F_3, \ldots, F_m$ are factors with coefficients a_1, a_2, $a_3, \ldots, a_m$. The factors F_i are group factors, common to some but not all of the variables, while U_j is a factor unique to the variance of the particular variable. "The basic problem of factor analysis is to determine the coefficients $a_{j_1}, \ldots, a_{jm}$ of the common factors."[12]

The variance of a variable in standard form is unity. If we take the variables in standard form and assume that the factors are uncorrelated, the squares of the coefficients can be written:

(2)

$$1 = \sigma^2_{Z_j}\text{ (variance)} = a^2_{j_1} + a^2_{j_2} + \ldots + a^2_{jm} + a^2_j.$$

The sum of the squares of the common factor coefficients is known as its communality, h^2. The square of the coefficient of the factor which appears exclusively in only one test (a^2_j) is known as the uniqueness and indicates the extent to which the common factors fail to account for the total variance of the variable. This uniqueness can be separated into specificity (factor or factors common to only one variable in this battery of tests) and unreliability (errors of measurement). The communality will be equal to reliability if specificity vanishes.

Holzinger[13] states that if a variable Z_j is correlated with any other variable Z_k, the resulting correlation may be written:

(3)

$$r_{jk} = a_{j_1}a_{k_1} + a_{j_2}a_{k_2} + \ldots + a_{jm}a_{km}$$

when the common factors are orthogonal. This may also be written in matrix form $R = FF'$ where the a_j's form the entries of the rows and columns of F and F' respectively. The diagonal of R will consist of unities (for the variable correlated with itself). The unique factors, being uncorrelated from test to test contribute only to the principal diagonal and not the side correlations. This property is extremely important to the analyst who is interested only in analyzing the common factor variance of the matrix. A correlation matrix with ones in the principal diagonal is square and symmetric and is known as a complete correlation matrix. If the diagonal elements are depressed from unity to the communalities, the matrix is known as a reduced correlation matrix. Common factor variances are required in this study, hence the reduced correlation matrix, with communalities in the diagonals, was used. The highest coefficient in each column was taken as the estimate of the communality.

The fundamental factor theorem is stated by Thurstone[14] as follows: "The product of the reduced factor matrix by its transpose is the reduced correlation matrix." ($FF' = R$) He also states that the number of common factors represented in a reduced correlation matrix is equal to the rank of the matrix. The basic problem being to account for the observed correlations in terms of the smallest number of common factors with the smallest possible error. This error involves the size of the residuals, which remain after the factoring, and when they may be considered negligible. A practicable method of determining negligible residuals will be discussed in the section on the centroid method of factoring.

In Chapter III of his book, Multiple Factor Analysis, Thurstone makes use of geometric analogies to clarify the relationship between the factor matrix F and the correlation matrix R. The numerical factor loading of the rows of the F matrix may be plotted as coordinates of a point. This point may be regarded as the end of a test vector. In this manner, the vectors of all the tests can be determined and represented in the diagram. Since the factors are considered to be uncorrelated or orthogonal, unit length reference vectors may be placed at right angles to each other and entered in the diagram. The number of dimensions of the diagram plot is determined by the number of columns in the F matrix. If the F matrix has three or more columns the rep-

11. Karl J. Holzinger and Harry H. Harman, Factor Analysis (Chicago: University of Chicago Press, 1941), p. 3.

12. Ibid., pp 12.

13. Ibid., p. 19.

14. L. L. Thurstone. Multiple-Factor Analysis (Chicago: University of Chicago Press, 1947), p. 81.

TABLE IV

INTERCORRELATIONS, ESTIMATED COMMUNALITIES, AND RESIDUAL MATRIX FOR PRACTICE TEACHING RATING PARTICIPATOR RATING SCALE (N = 76)

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	h^2
I		042*	043	023	002	001	028	010	049	022	017	021	024	536
II	514		102	055	005	002	065	023	115	053	041	049	056	670
III	506	670		056	005	002	006	024	117	054	041	050	057	670
IV	401	515	456		003	001	036	013	063	029	022	027	031	756
V	302	613	541	695		000	003	001	006	003	002	002	003	774
VI	536	497	392	665	643		001	000	002	001	001	001	001	665
VII	406	559	572	644	774	612		015	075	034	026	032	037	774
VIII	412	643	605	630	743	558	605		027	012	009	012	013	743
IX	336	443	497	531	562	396	445	704		060	046	056	084	704
X	289	443	476	547	632	454	529	663	638		021	026	030	663
XI	206	570	499	522	658	344	558	596	392	656		020	023	658
XII	404	527	488	494	478	424	463	594	615	571	459		028	615
XIII	450	520	551	756	607	568	589	692	608	499	446	554		756

*Decimal points omitted. Residuals have been placed in upper triangle, underlined.

TABLE V

CENTROID FACTOR MATRIX FOR PRACTICE TEACHING RATING PARTICIPATOR RATING SCALE (N = 76)

	F_1	F_2	F_3	F_4
I	551*	-134	438	134
II	754	064	149	317
III	720	150	167	322
IV	792	-299	-088	-174
V	835	-057	-283	016
VI	703	-431	017	-006
VII	783	-237	-217	206
VIII	852	123	008	-074
IX	715	240	120	-362
X	734	252	-202	-167
XI	685	241	-392	128
XII	696	220	147	-156
XIII	796	-134	138	-178

*Decimal points omitted.

resentation must be made in three dimensional or higher forms. Geometrically, the coefficient of each factor loading is represented as a projection of the test vector on a reference vector.

It can be shown that the intercorrelations of the test scores is equal to the scalar product of their test vectors "which involves one of the central ideas in factorial theory, namely, that the correlation matrix determines the test vectors as to their lengths and angular relations."[15] The side entries of the correlation matrix determine the angular separation of the test vectors and the lengths of the test vectors in common factor space are determined by the square root of their communalities. The correlation matrix defines a configuration of test vectors but does not define the location of the reference axes. The relationship between the factor matrix F and correlation-matrix R is simply this: The factor matrix is a factorial interpretation or inserting of a reference frame into the test configuration determined by the reduced correlation matrix. The rank of the correlation matrix, the number of dimensions needed to represent the test vectors geometrically and the number of common factors in the test battery are all the same. Each column of the factor matrix identifies a factorial axis in the structure. Nevertheless, an infinite number of factor matrices F can be written which will reproduce a given correlation matrix R through the multiplication FF', therefore, we do not have a unique solution. The problem of rotation of reference axes also must be met. This will be described later.

Thurstone's Centroid Method of Factoring

The purpose of factoring a correlation matrix is to account for the intercorrelations with fewer factors than there are tests. This factoring should be done so as to minimize the residuals after each factor has been determined. The centroid method is regarded as a first approximation to the major principal axis of the factor configuration. This main centroid axis is so placed that it has zero projections on all the remaining coordinate axis. This fact leads to the theorem that "The sum of the coefficients in the correlation matrix is equal to the square of the sum of the first centroid factor loadings,"[16] permitting factoring through simple summational procedure after appropriate reflections. For the detailed step by step process of factoring used in this study, see Thurstone's "complete centroid method."[17]

The extraction of each centroid reduces the residuals in the correlational matrix. The factoring process is ordinarily stopped when the standard deviation of the residuals is less than the standard error of a zero correlation. In this study, communalities are used in the diagonals of the reduced correlation matrix. It is time to stop factoring when these communalities have been completely reduced.

Methods of Rotation Used in This Study

After the centroids were extracted, extended vector diagrams were made of the centroids. An examination of the diagrams revealed points whose relative positions were consistent from diagram to diagram. One point was considered to represent a general factor and three other points were considered as defining planes with the origin and the "general factor" point. The primary axes were considered to lie in these planes. Direction numbers of the variables were taken from the orthogonal factor matrix and normalized. The values for the general factor were substituted directly in the first column of T; the other three columns of T were calculated by the following formulae:

Where G is the General Factor, V the variable and A the axis desired, the Direction Cosine Form is:

∡G	∡V	∡A
a	g	m
b	h	n
c	j	o
d	k	p

Require (1) $am+ba+co+dp = 0$ (orthogonal)

(2) $m = ya+ag$
$n = yb+zh$ (in the plane)
$c = yc+zj$
$p = yd+zk$

Let $(ag+bh+cj+dk) = r_{gv}$
Then $y = -z\,(r_{gv})$

$$z^2 = \frac{1}{1 - r^2_{gv}}$$

$$y^2 = \frac{r^2_{gv}}{1 - r^2_{gv}}$$

15. Ibid., p. 91.

16. Ibid., p. 152.

17. Ibid., pp. 161-170.

The direction cosines of T will transform the centroids directly to primary structure. Harris and Knoell[18] have shown the relationship between primary structure and simple structure as follows: The direction cosine matrix T when pre-multiplied by its transpose yields Φ, a matrix of intercorrelations of the new factors. The inverse of Φ, pre-multiplied by T produces a matrix of direction numbers hich when normalized results in Λ which transforms F into the simple structure. The matrix notation for the above operations follows:

$$T'T = \Phi$$
$$TO^{-1} = \Lambda \quad \text{(when normalized)}$$
$$F\Lambda = V \quad \text{(simple structure)}$$

This simple structure has a general factor and three group factors and is an oblique solution. By rotation of one axis, the general factor, some of the general factors' test loadings were reduced to zero so it became a groupfactor. Thurstone's[19] criteria for uniqueness of simple structure were used as a basis for the above rotation.

Factor Analysis of the Practice Teaching Ratings

The intercorrelations of the thirteen traits on the Participator Rating Scale for the practice teaching rating are shown in Table IV. The largest correlation in each column was used as the estimated communality. Four centroids (Table V) were extracted before the residuals were considered to be negligible. The residuals and the estimated communalities are also included in Table IV.

Extended vector plots were made from the four centroids. Examination of the plots suggested variable XI as a general factor and three other factors, each perpendicular to XI and in the plane of XI, the origin and one of the three following points IX, VI, and II. The direction numbers were taken from the centroid loadings and normalized to give a matrix of direction cosines. This matrix was used to calculate the transformation matrix T by the procedure discussed in a proceeding section. The inverse of T'T was calculated and then pre-multiplied by T to give a matrix which when normalized by columns yields Λ. The Λ matrix, when pre-multiplied by F, the centroid matrix, transforms F into simple structure, V. Radial rotation, as described by Thurstone[20] were used to abandon the general factor and make the group factors more amenable to interpretation. The final Λ matrix, the final V matrix (simple structure), and the Φ matrix (which shows the intercorrelations of the factors in the oblique solution) are shown in Tables VI, VII, and VIII, respectively.

Interpretation of the Practice Teaching Rating Factor Matrix

Four group factors were found to account for the intercorrelations of the original correlation matrix. Inferences as to the nature of the common factors is made in terms of the number of significant loadings in each column and the complexities of the variables. Complexity refers to the number of significant loadings it has in the simple structure. In this solution, four of the variables are of complexity one and the remaining nine are of complexity two. An interpretation of each factor follows.

Common Factor: Pupil Response

The factor loadings are as follows:

II	Voice and Diction	.40
III	Use of English	.42
V	Adaptability	.40
VII	Emotional Stability	.40
VIII	Grasp of Specific Subject Matter	.26
X	Skill in Analyzing Learning Problems, Selecting and Organizing Appropriate Learning Experiences	.35
XI	Skill in Maintaining Pupil Interest, Purpose, and Attention	.62*

*Complexity one

Variable XI is the only complexity one variable in the factor and the variable with the greatest loading, therefore it gives the key to the naming of this factor. All the other variables can be seen as contributing to this factor, which is interpreted as Pupil Response.

Common Factor: Technical Competence

The factor loadings are as follows:

IV	Initiative	.39
VI	Relations with Others	.24
VIII	Grasp of Specific Subject Matter	.35
IX	Professional Understandings	.59*
X	Skill in Analyzing Learning Problems, Selecting and Organizing	

18. Chester W. Harris and Dorothy M. Knoell. "The Oblique Solution in Factor Analysis," Journal of Educational Psychology (November 1948), pp. 385-405.

19. L. L. Thurstone, ibid., p. 338.

20. Ibid., pp. 194-205.

TABLE VI

Λ MATRIX FOR PRACTICE TEACHING RATING
PARTICIPATOR RATING SCALE
(N = 76)

	V_1	V_2	V_3	V_4
F_1	3225*	5267	2264	2180
F_2	4399	-0028	-9121	2102
F_3	-5327	2724	-2446	7151
F_4	6471	-9049	-2389	6300

*Decimal points omitted.

TABLE VII

V (SIMPLE STRUCTURE) PRACTICE TEACHING RATING
PARTICIPATOR RATING SCALE
(N = 76)

	V_1	V_2	V_3	V_4
I	-028*	179	108	490
II	397	000	000	484
III	413	-011	-056	511
IV	058	393	515	-063
V	405	182	306	-022
VI	024	241	550	071
VII	397	011	397	095
VIII	277	347	096	171
IX	038	593	000	064
X	347	335	-010	-037
XI	618	000	000	000
XII	211	408	-042	205
XIII	009	459	311	132

*Decimal points omitted.

TABLE VIII

ϕ MATRIX (INTERCORRELATIONS OF PRIMARY AXES)
PRACTICE TEACHING RATINGS
PARTICIPATOR RATING SCALE
(N = 76)

	P_1	P_2	P_3	P_4
P_1	1.0000	.6097	.3085	.1398
P_2	.6097	1.0000	.1132	.2664
P_3	.3085	.1132	1.0000	.4422
P_4	.1398	.2664	.4482	1.0000

	Appropriate Learning Experiences	.34
XII	Skill in Evaluation	.41*
XIII	Cooperative Attitude	.46

*Complexity one

Two variables are of complexity one in this factor. Variable IX has the largest loading and consequently carries the greatest weight in interpreting this factor. It is followed by Variable XIII, Cooperative Attitude, a variable of complexity two with its maximum loading on this factor. Variable XII, Skill in Evaluation, is closely related to the No. IX, Professional Understandings. These three variables led to the interpretation of this factor as Technical Competence.

Common Factor: Relations with Others

The factor loadings are as follows:

IV	Initiative	.52
V	Adaptability	.31
VI	Relations with Others	.58
VII	Emotional Stability	.40
XIII	Cooperative Attitude	.31

None of the factor loadings on this factor are of complexity one, which makes it difficult to interpret. The highest loadings are in Variables IV and VI. These also are the highest loadings for these two variables in the factor matrix. Variable VII, Emotional Stability, is of complexity two with its factor loadings divided equally between this factor and the factor, Pupil Response. Variables IV, VI, and VII represent a combination of traits suggestive of Relations with Others.

Common Factor: Personal Appeal

The factor loadings are as follows:

I	Appearance	.49
II	Voice and Diction	.48
III	Use of English	.51

Only three factor loadings appear in this factor, one of which (Appearance) is of complexity one. Use of English has the maximum loading on this factor and has also the maximum loading of this complexity two variable. A combination of all three variables give the best interpretation of this factor—Personal Appeal.

Summary of Practice Teaching Ratings Analysis

From the preceding analysis, the four common factors were identified as Pupil Response, Technical Competence, Relations with Others, and Personal Appeal. The factors are oblique with sizeable correlations between Pupil Response and Technical Competence (.61); Relations with Others and Personal Appeal (.45); and Pupil Response and Relations with Others (.31). All the correlations are positive.

Factor Analysis of the Beginning Teacher Ratings

Four centroids were extracted from the Beginning Teacher Ratings before the residuals were considered to be negligible. The rotational procedure for these centroids was the same as that used for the Practice Teaching Rating with the general factor from the extended vector plots being Variable XII and the other three points Variables XIII, VIII, and I. The intercorrelations of the thirteen traits, residuals after the fourth centroid was extracted, and estimated communalities are shown in Table IX. The four centroids, the Λ matrix, the final V matrix (simple structure), and the Φ matrix (which shows the intercorrelations of the factors in the oblique solution) are shown in Tables X, XI, XII, and XIII, respectively.

Interpretation of the Beginning Teacher Rating Factor Matrix

The four group factors which were found to account for the original correlation matrix did not represent as neat a solution as was found for the Practice Teaching Rating matrix. Only three of the variables were of complexity one, seven were of complexity two, and the remaining three of complexity three. An interpretation of the four group factors follows.

Group Factor: Technical Competence

The factor loadings are as follows:

II	Voice and Diction	.34
III	Use of English	.28*
V	Adaptability	.37*
VIII	Grasp of Specific Subject Matter	.46
IX	Professional Understandings	.60**
X	Skill in Analyzing Learning Problems, Selecting and Organizing Appropriate Learning Experiences	.36
XI	Maintaining Pupil Interest, Purpose, and Attention	.34*
XII	Skill in Evaluation	.70**

*Complexity three
**Complexity one

Two of the variables in this factor are of complexity one, namely IX and XII. Of the three variables of complexity three, V and XI have maxi-

TABLE IX

INTERCORRELATIONS, ESTIMATED COMMUNALITIES, AND RESIDUAL MATRIX
FOR BEGINNING TEACHER RATING
PARTICIPATOR RATING SCALE
(N = 76)

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	h^2
I		014*	069	047	008	005	022	010	049	007	015	061	062	545
II	398		022	015	003	002	007	005	016	002	005	020	020	566
III	346	449		075	013	008	036	016	079	011	024	098	099	449
IV	303	429	338		009	006	025	011	054	007	016	067	068	652
V	325	542	382	652		001	004	002	010	001	003	012	012	699
VI	486	448	265	505	495		003	001	006	001	002	007	007	631
VII	545	500	500	651	591	618		005	026	004	008	032	032	651
VIII	192	362	425	517	481	398	352		011	002	003	014	014	649
IX	217	484	397	499	699	466	475	649		008	017	071	071	724
X	260	360	324	502	543	353	476	595	586		002	010	010	595
XI	403	566	338	494	567	552	586	424	598	485		021	021	598
XII	346	482	315	380	573	387	401	528	724	565	560		088	724
XIII	319	358	177	389	477	631	481	267	426	396	404	332		631

*Decimal points omitted. Residuals have been placed in upper triangle, underlined.

TABLE X

CENTROID FACTOR MATRIX FOR BEGINNING TEACHER RATING PARTICIPATOR RATING SCALE
(N = 76)

	F_1	F_2	F_3	F_4
I	529*	-387	-168	207
II	672	-103	-267	067
III	509	105	-248	331
IV	713	051	340	227
V	794	116	051	-040
VI	704	-368	142	-025
VII	749	-260	122	108
VIII	660	426	048	048
IX	785	311	-022	-239
X	682	264	120	-033
XI	743	-094	-120	-071
XII	714	229	-285	-296
XIII	597	-291	294	-298

*Decimal points omitted.

TABLE XI

A MATRIX FOR BEGINNING TEACHER RATING PARTICIPATOR RATING SCALE
(N = 76)

	V_1	V_2	V_3	V_4
F_1	4014*	4173	2990	3597
F_2	5687	-7193	5109	-4367
F_3	-6009	5511	5215	-4761
F_4	-3930	-0667	6145	6732

*Decimal points omitted.

mum loading for their variables. Variables VIII and X, both of complexity two, split their loadings between this factor and the factor "Initiative." Because of the similarity of function in variables IX and XII this factor has been interpreted as Technical Competence.

Group Factor: Cooperative Attitude

The factor loadings are as follows:

I	Appearance	.39
IV	Initiative	.43*
V	Adaptability	.28
VI	Relations with Others	.64
VII	Emotional Stability	.56
XI	Maintaining Pupil Interest, Purpose, and Attention	.32*
XIII	Cooperative Attitude	.64**

*Complexity three
**Complexity one

The major loadings on this factor are on Variables XIII and VI. Variable XIII is of complexity one and Variable VI, of complexity two, has its maximum loading on this factor. Variable VII, Emotional Stability, is seen as a contributing aspect of the factor interpretation—Cooperative Attitude.

Group Factor: Initiative

The factor loadings are as follows:

III	Use of English	.28*
IV	Initiative	.58*
V	Adaptability	.30
VIII	Grasp of Specific Subject Matter	.47
X	Skill in Analyzing Learning Problems, Selecting and Organizing Appropriate Learning Experiences	.38

*Complexity three

This factor has the lowest number of significant variable loadings of any found in the Beginning Teacher Rating Factor matrix. The highest loading is on Initiative, a variable of complexity three, which has its maximum loading on this factor. The loadings of Variables VIII and X (both of complexity two) are their maximum loadings. The combination of the above three traits seems to indicate Initiative as the best interpretation of this factor.

Group Factor: Personal Appeal

The factor loadings are as follows:

I	Appearance	.58
II	Voice and Diction	.46
III	Use of English	.48*
VI	Relations with Others	.33
VII	Emotional Stability	.40
XI	Maintaining Pupil Interest, Purpose, and Attention	.32*

*Complexity three

The first three factor loadings are the maximum loadings for these particular variables. Variables I and II are of complexity two while Variable III is of complexity three. The remaining three variables are the minimum loadings on variables of complexity two (VI, VII) and three (XI). The factor can be thought of as the impression created by physical appearance and oral expression of the teacher. It may be interpreted as Personal Appeal.

Summary of Beginning Teacher Rating Analysis

Four common factors, interpreted as Technical Competence, Cooperative Attitude, Initiative, and Personal Appeal were found to account for the interrelationships of the Beginning Teacher Rating Correlation Matrix. These factors are oblique with a high correlation (.80) between Technical Competence and Cooperative Attitude, and slight correlations between the other three factors. The correlations between Personal Appeal and the other group factors are all negative.

Summary and Comparison of the Two Factor Solutions

Both factor solutions were interpreted in terms of four common factors, with two factors in each solution being similar. The factor loadings for one of the two comparable common factors, Technical Competence, is as follows:

II	Voice and Diction		.34
III	Use of English		.28*
IV	Initiative	.30	
V	Adaptability		.37*
VI	Relations with Others	.24	
VIII	Grasp of Specific Subject Matter	.35	.46
IX	Professional Understandings	.59**	.60**
X	Skill in Analyzing Learning Problems, Selecting and Organizing Appropriate Learning Experiences	.34	.36
XI	Maintaining Pupil Interest, Purspose, and Attention		.34*
XII	Skill in Evaluation	.41**	.70**
XIII	Cooperative Attitude	.46	

*Complexity three
**Complexity one. All others are complexity two.

TABLE XII

V (SIMPLE STRUCTURE) BEGINNING TEACHER RATING
PARTICIPATOR RATING SCALE
(N = 76)

	V_1	V_2	V_3	V_4
I	001*	392	000	549
II	345	203	050	459
III	283	-023	280	478
IV	022	433	556	225
V	370	279	299	184
VI	-003	638	081	329
VII	037	589	221	398
VIII	459	-013	470	061
IX	599	108	235	-004
X	365	183	381	051
XI	345	316	068	318
XII	704	-003	000	093
XIII	015	641	000	001

*Decimal points omitted.

TABLE XIII

Φ MATRIX (INTERCORRELATIONS OF PRIMARY AXES)
PRACTICE TEACHING RATINGS
PARTICIPATOR RATING SCALE
(N = 76)

	P_1	P_2	P_3	P_4
P_1	1.0000	.6029	.1794	-.0231
P_2	.6029	1.0000	.1123	-.1380
P_3	.1794	.1123	1.0000	-.0533
P_4	-.0231	-.1380	-.0533	1.0000

Both factors had two complexity one variables, which were the same variables for both factors. Two other common variable loadings, traits VIII and X, were also found between the two factors. This correspondence of variables and complexity, particularly of Variables IX and XII, resulted in their interpretation as evidence of the same factor.

The factor loadings for the second common factor, Personal Appeal, are as follows:

I	Appearance	.49*	.58
II	Voice and Diction	.48	.46
III	Use of English	.51	.48**
VI	Relations with Others		.33
VII	Emotional Stability		.40
IX	Maintaining Pupil Interest, Purpose and Attention		.32**

*Complexity one
**Complexity three. All others are complexity two.

The three major loadings on both factors are the same with the factor from the Beginning Teacher Rating having three additional loadings. These additional loadings are minimum rather than maximum loadings for their respective variables. They serve, however, to substantiate the interpretation made concerning the naming of the factor.

While there is considerable agreement in the common factors, "Relations with Others" of the practice teaching analysis and "Initiative" of the beginning teacher analysis, there are also many discrepancies. Both have five traits contributing to their factors with Trait IV, Initiative, having a major loading and Trait V a minor loading common to both factor interpretations. The discrepancies come in the other three traits making up the factor loadings. There are two major loadings on each factor; "Initiative" being a common major loading, and "Relations with Others" and "Grasp of Specific Subject Matter" major loadings on the Practice Teaching and Beginning Teacher Factors respectively. The two minor loadings also point up the differences, therefore, in spite of the above mentioned similarity, "Relations with Others" and "Initiative" are not considered the same common factor.

The correlation between the factors common to both analyses shows a positive correlation (.27) between Technical Competence and Personal Appeal on the practice teaching analysis and negative correlation (-.02) in the beginning teacher analysis.

The common factors in the beginning teacher analysis had sizeable correlations between Pupil Response and Technical Competence (.61); Relations with Others and Personal Appeal (.45); and Pupil Response and Relations with Others (.31). All of the correlations are positive. The beginning teacher analysis had only one sizeable correlation, (.60) between Technical Competence and Cooperative Attitude. All the coefficients between Personal Appeal and the other three factors are negative.

The above differences, even though two of the four factors in each analysis were comparable, would seem to indicate that critic teachers and principals are looking for different characteristics or abilities in the people that they train and employ, or that different values are placed upon the various abilities.

SECTION V

SUMMARY AND CONCLUSIONS

Statement of the Problem

THE PURPOSE of this investigation was to determine by a correlational analysis the relationship between success in practice teaching and success in the first year of teaching. The ratings of the teachers, first as practice teachers and then as beginning teachers, were further analyzed factorially, 1) to determine common factors in each rating, and 2) to compare the factor patterns of the ratings.

Measures Used in the Analyses

The data used can be classified into three groups:

I. Measures of Practice Teaching Success
II. Measures of In-Service Success
III. Measures of Pre-Service Ability

Group I consists of:

1. The Participator Rating Scale
2. Practice Teaching Grades (first and second semester)

Group II consists of:

1. The Principal's Acceptability Rating
2. The Principal's Rating on the Wisconsin High School Participator Rating Scale
3. The Principal's Rating on the Wisconsin Adaptation of the M Blank
4. Two visiting Supervisors' Ratings on the Wisconsin Adaptation of the M Blank

Group III consists of:

1. The Professional Grade Point Average

(practice teaching grade omitted)
2. The Academic Grade Point Average for Junior and Senior Years
3. The Percentile Rank on American College of Education Psychological Examination

Design of the Study

Seventy-six students who had graduated from the University of Wisconsin with the Teachers Certificate and who had obtained their first teaching positions in the State of Wisconsin in the fall of the year 1950 were chosen for this study. Each beginning teacher was visited by a team of supervisors from the University of Wisconsin who interviewed the teacher and rated her performance in the classroom, and in addition, interviewed her principal and collected his ratings of the beginning teacher. Other data were obtained from University records.

All ratings, scores and grades, were converted to numerical scores for the analysis. Pearson product-moment correlations were used throughout the study. The intercorrelations of traits of the practice teacher and beginning teacher ratings were factored using Thurstone's complete centroid methods. The centroid solutions were plotted on extended vector diagrams and then rotated to oblique, simple structure solutions.

Results from the Correlational Analysis

The coefficients of correlation between mid- and final semester ratings of the first semester of practice teaching were substantial, ranging from .524 to .741. The relationship between the grades for first and second semester practice teaching was .636. This decreased to .550 when the scores were changed to standardized scores. The relationship between the final ratings for practice teaching and ratings for the first semester of in-service teaching on the same traits on the Participator Rating Scale was slight, ranging from .276 to -.061.

The relationship between the four in-service measures ranged from .549 to .389. When the in-service measures were correlated with the pre-service measures of teaching ability (except the practice teaching ratings) the coefficients were uniformly low.

Answers to the first four questions asked in this study are as follows:

1. The relationship between first semester final Practice Teaching Grade and the pre-service measures of ability was high (.615) for Academic Grade Point Average for the junior and senior years; low (.194) for the Professional Grade Point Average minus Practice Teaching Grade; and near zero (.002) for the American Council on Education Psychological Examination Percentile Rank. Of the above named pre-service measures of ability, Academic Grade Point Average is closely related (.615) to the practice teaching grade.

2. Practice Teaching success, as measured by first semester practice teaching grades, shows a higher relationship than Professional Grade Point Average minus Practice Teaching Grade to all in-service measures, except the Acceptability rating, but all the coefficients were near zero. All the coefficients between Professional Grade Point Average (minus Practice Teaching Grades) and the in-service measures, with the exception of the Acceptability rating, are negative, though small, while those of the Practice Teaching Grade and in-service measures are all positive though near zero.

3. The relationships between pre-service measures of ability and the in-service criteria of success are all near zero, ranging from -.10 to .06. The Percentile Rank on the American Council on Education Psychological Examination coefficients with the in-service criteria are all negative.

4. The relationships between the same traits on the first semester final practice teaching and the principal's ratings are all slight. Two of the thirteen traits have coefficients of over .2 and two have negative coefficients.

Results from the Final Practice Teaching Rating Analysis

Four oblique common factors were found to account for the intercorrelations of traits of the Final Practice Teaching Rating. The common factors and the traits having their major loadings on these factors are:

I. Pupil Response: Skill in Maintaining Pupil Interest, Purpose and Attention; Adaptability; Emotional Stability; Skill in Analyzing Learning Problems and Selecting and Organizing Appropriate Learning Experiences.

II. Technical Competence: Professional Understandings; Skill in Evaluation; Cooperative Attitude; Grasp of Specific Subject Matter; Skill in Analyzing Learning Problems and Selecting and Organizing Appropriate Learning Experiences.

III. Relations with Others: Relations with Others; Initiative; Emotional Stability.

IV. Personal Appeal: Appearance; Use of English; Voice and Diction.

Four of the thirteen traits in the simple struc-

ture solution are of complexity one and the remaining nine traits are of complexity two. The complexity one traits for this analysis are: (1) Appearance; (2) Professional Understandings; (3) Skill in Maintaining Pupil Interest, Purpose, and Attention; and (4) Skill in Evaluation.

All the common factors are positively correlated. Sizeable correlations are found between Pupil Response and Technical Competence (.61); Pupil Response and Relations with Others (.31); and Relations with Others and Personal Appeal (.45).

Results from the Beginning Teacher Rating Analysis

Four oblique common factors were found to account for the intercorrelations of traits of the Beginning Teacher Rating. The common factors are:

I. Technical Competence: Skill in Evaluation; Professional Understandings; Grasp of Specific Subject Matter; Adaptability; Skill in Analyzing Learning Problems and Selecting and Organizing Appropriate Learning Experiences.

II. Cooperative Attitude: Cooperative Attitude; Relations with Others; Emotional Stability.

III. Initiative: Initiative; Grasp of Specific Subject Matter; Skill in Analyzing Learning Problems and Selecting and Organizing Appropriate Learning Experiences.

IV. Personal Appeal: Appearance; Use of English; Voice and Diction.

Three of the thirteen traits in the simple structure solution are of complexity one, seven are of complexity two, and the remaining three are of complexity three. The complexity one variables for this analysis are: (1) Professional Understandings; (2) Skill in Evaluation; and (3) Cooperative Attitude.

The only sizeable correlation (.60) between factors is found between Technical Competence and Cooperative Attitude. All other coefficients are low and positive except those between Personal Appeal and the other three factors which are low and negative.

General Conclusions

The relationships between pre-service measures are relatively high in several instances, ranging from .524 to .741 on the mid-semester and final ratings of student teaching on the Participator Rating Scale; .636 between first and second semester practice teaching grades; and .615 between first semester practice teaching grade and academic grade point average, junior and senior years. The relationships between the four in-service measures are also sizeable, ranging from .389 to .549. The relationships between pre-service and in-service measures, however, are negligible. The relationships between the same traits, Voice and Diction and Adaptability, on the pre-service and in-service ratings showed the largest coefficients, .276 and .231, respectively. The relationship between the principal's M Blank rating and the first semester practice teaching grade, .20, was the only other coefficient to equal or exceed .2. Over half of the coefficients, excluding the participator ratings, had slight negative values. These facts lead to the conclusion that the relationship between practice teaching ability and success in the field, as defined and measured in this study, are negligible.

The presence of sizeable correlations both among pre-service and among in-service ratings but not between pre-service and in-service ratings leads the author to question a basic assumption, namely, that practice teaching and actual teaching are comparable activities.

There is considerable agreement between two of the four common factors found in the analyses of the practice teaching and beginning teacher ratings, but there are nonetheless important differences. These two factors are interpreted as Technical Competence and Personal Appeal. The correlations between these two factors were .27 for the practice teaching rating and -.02 for the beginning teacher rating. High positive relationships are also found between three pairs of factors in the practice teaching analysis but only one large positive and three small negative relationships are found between the factors in the beginning teacher analysis. The above differences lead to the conclusion that in spite of the similarity of name in the two factors common to each analysis, critic teachers and principals are emphasizing different characteristics or abilities in the people they train and hire, or else they place different values upon and seek different combinations of the same abilities.

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